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Volume 55
Number 10

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Journal of Forestry

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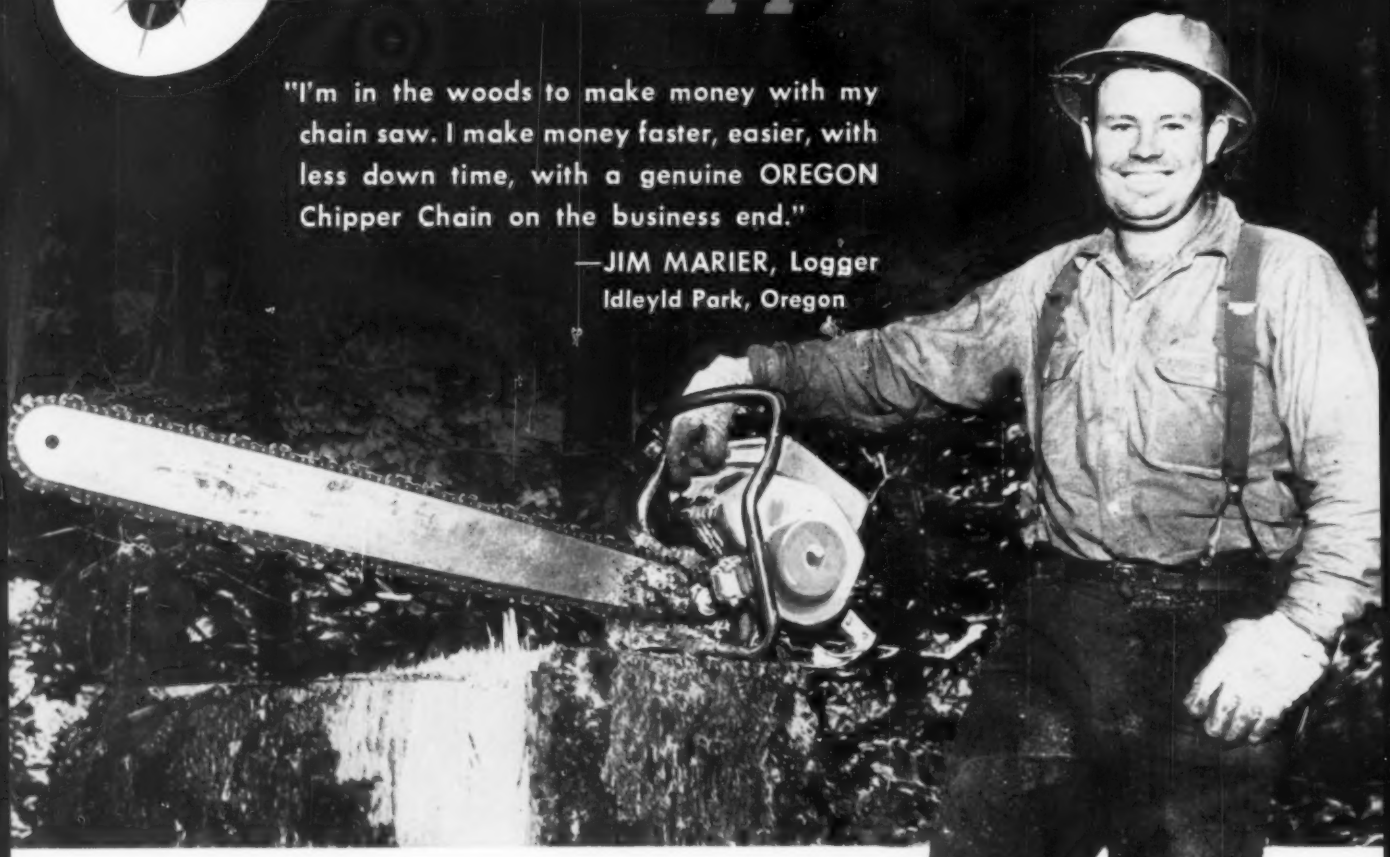

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Journal of Forestry

Official Organ of the Society of American Foresters

Forestry in an Era of Change

Editorial

FORESTS develop to full stature only with stable soil, climate, and stable land management policy. Neither the shortening of timber rotations nor the development of rapidly growing hybrids has obviated the need for such stability. A key issue in forestry today is to obtain increased stability in forest land use while nearly everything is moving in the opposite direction—towards faster change. Farms give way to suburbs, forests to park and recreational lands, highways cut through farms and forests alike, laboriously built up. Industry is demanding more and more lands for factory sites with the attendant parking lots, approach roads, and testing grounds. Current social and economic ferment pervades our life and thinking and is leading towards new patterns still in the formative stage.

The rapidly growing population, perhaps as much a result as a cause of our economic and industrial boom, still serves to feed its growth. Our awakened interest in people of other lands and, especially their own urge towards enjoying the economic fruits of industrial development, has caused rapid change to characterize their activities as well. American experts are consequently going abroad seeking to help other countries to establish forestry and other programs that will provide the base for new economic opportunities. One wonders if the expert advice we so freely dispense abroad might not be equally fruitful if applied seriously in our own country.

As foresters, we have been riding the current economic boom with the same enthusiastic abandon that characterizes American industry and labor as a whole. The developments in forestry during the past 12 years are truly breath-taking. They go beyond the fondest dreams of foresters during the 1930 period. The ready acceptance by the wood-using industries of the importance of forestry and the impressive forestry programs that are now commonplace are a source of gratification and pride. These actions are setting new patterns of forest land use that we hope will prevail for a long time to come.

But other things are happening, too, some of which may tend to undermine these developments. In the northeast where population density is heavy, the demands on land are increasing at a rapid rate. New York may well serve as an example. A brief review of major forestry developments in the state as they relate to forest and agricultural land use will help furnish background to appraise present trends.

Land clearing in New York began three centuries ago. It continued almost unabated for over two centuries. It is only during the last 50 years that the trend has reversed. The major purpose was to obtain timber for farms, homes, and factories and to clear land for cultivated crops. New York State owned much public land and sought to dispose of this to settlers. To encourage them, it constructed military roads, made land grants to soldiers, and made it easy for the timber operator to acquire land, log the timber, and dispose of the land to settlers. Despite efforts to extend agriculture into the mountainous section of this state, little success was achieved. Land was purchased for timber cutting, the trees harvested, and the land allowed to go tax delinquent, often before the full purchase price had been paid.

This situation reached such a stage that public resentment led to the creation of the Adirondack-Catskill forest preserve in which no timber cutting for commercial purposes is permitted and the lands are kept forever as wild forest lands by constitutional provision. This provision has been retained in this state's constitution since 1892 despite efforts on the part of timber operators, foresters, and others to have it changed. It is defended as vigorously today as at the time of its enactment despite the progress in forestry.

Outside the mountain areas farming spread rapidly. Efforts to promote agricultural developments reached a peak about 1880 when some 23 million out of 30.6 million acres in the state were included in farms. Heroic efforts were required to clear the fields of the huge stumps left after logging and even greater effort to haul the stones from the fields so that the land might be cultivated. Many fields so laboriously cleared soon proved unsuited for cultivation and later were even abandoned for pasture. Today we find some of our finest white pine timber growing on fields cleared almost a century ago. Even the hill farms in the southern part of the state gradually contracted in size as they were subjected first to the competition of grain brought in from the level fertile fields of Indiana, Illinois, and Iowa, and

later to the greater productivity of the valley dairy farms where supplemental feeds and good roads enticed the farmers out of the hills.

The agriculture economist feels that the contraction in agricultural land in New York State is destined to continue for some time yet to come. The improvements in crops, in fertilizer practice, and above all, in the application of mechanical power to cultivation has placed the hill farms at increasingly greater disadvantage compared with the more level lying valley lands. Being more productive in the first place the valley lands benefit percentage-wise as much as the hill lands by each new improvement. Consequently, the hill farm provides progressively more meager returns for human energy expended upon it. Land studies in Broome County, for example, reveal a 40 percent decline between two successive land classification surveys made 12 years apart in the amount of land in the county that could support a farm family in ordinary times. This decline is due mostly to changed economic conditions and farming methods and little, if any, to soil deterioration.

To prevent such land from depressing agricultural land prices generally and particularly to make it an economic asset rather than a public burden, agricultural interests succeeded in 1929 in passing the State Reforestation Act which provided for buying up submarginal farms and retiring them to forests. The provisions of this act have led to the acquisition of some 550 thousand acres now administered by the Conservation Department. As a further effort to take land out of agricultural production, the state inaugurated a vigorous program of encouraging private tree plantings. Hundreds of landowners participated and thousands of acres have been planted throughout the state.

Neither of these programs has yet succeeded in removing all submarginal farm lands from crop and pasture use. Other influences have meanwhile been brought to bear. The farm forestry programs of which the latest, the Soil Bank Act, have further stimulated tree planting on an extensive scale. In addition, the lucrativeness of Christmas tree growing has led to widespread planting of trees on abandoned hill farms. Meanwhile, natural regeneration is spreading out from existing forest land, across the abandoned pasture or field, giving rise to new stands of white pine, paper birch, aspen, ash, and other hardwoods. Forest and potential forest land now cover half the land o fthe state and seem destined to do so for decades to come.

As one travels across the Allegheny Plateau which makes up the southern part of western New York State and along the fringes of the Adirondacks and Catskills, he sees many young forests, some owned by the state, a few in other public ownership, and others in private ownership. These seem to indicate a favorable future for forestry. Closer examination, however, reveals that ownership changes frequently in some hill counties as often as once every 5 years, and that the present owners have little idea of a long-term policy of forest development and use. Even if they did have, the holdings are mostly so small in size as to make intensive forestry uneconomic. Studying such developments, one is led to question if small private holdings whether exploitively or consciously managed for timber are likely to provide the major timber supply of the future. In fact, doubt exists if they will ever play a significant role in meeting future timber needs.

New developments are pressing on the land in central and western New York to cloud the forestry outlook. Rural residence is one of these. Land use instability is epitomized by the rural residence movement. The development of prosperous industries along the New York Central and other major railways of this state has offered attractive employment to hill farmers and accentuated the tendency to abandon land. At the same time, the city workers, seeking cheap dwellings and freedom from city taxes, have purchased such farms as homesites from which they commute by motor car to their daily job in the city. It is becoming increasingly difficult to block out lands for forestry purposes in the neighborhood of any city because of the attractiveness of such lands to the homeseeker. Many rural residences are fine, new dwellings that afford the family most of the advantages of the modern home in a country environment. Others are poorly repaired, outmoded farm dwellings or hastily constructed shacks that simply recreate in the country the slum condition of the city.

Pressures on land are developing from other sources. Campsites for Boy and Girl Scouts, Camp Fire Girls, church camps, school camps and forests, lands for company recreation clubs, privately operated boys' and girls' camps, adult camps, 4-H camps, and camps operated by other civic or eleemosynary groups are spotted hither and yon on forest land. Each organization seeks to control enough land to give full scope to its activities.

Of especial significance to foresters is the acquiring of land by fish and game clubs or more frequently the leasing and posting of such land. This concentrates public fishing and hunting the more heavily on unposted lands with growing dissatisfaction to the sportsman and landowner. New York this current year passed an act to provide planting stock, increased protection, and certain other services to private landowners willing to cooperate in improving fish and wildlife habitats and permitting public use of their lands.

It should be clearly recognized that all the above uses of forest land including rural residences are both legitimate and desirable. Any attempt to prevent such use of land would properly arouse public resentment and open the way to legislation as drastic in scope as the constitutional provision on the forest preserve. Land posting alone is creating resentment against landowners and increasing the demand for public shooting lands. The sportsmen, wilderness lovers, bird

watchers, and other recreationists have learned how to apply political pressures to achieve their goals and their numbers and influence are increasing, not diminishing. How to avoid devoting large areas to single rather than multiple use, prevent fragmentation of holdings, and unduly diversified objectives that preclude economic forest management is a key forestry task. Many if not all of the objectives sought by such classes of owners could be realized under a properly integrated plan of multiple use forestry.

In northern New York, much of the softwood timber is located in large private forest holdings that are superficially stable, but actually important changes are taking place in the quality of use of this forest land. Industrial forest management has a history of over 60 years in this region. Much has been achieved, still the results generally are below expectations. The spruce and fir have been heavily cut for pulpwood and the white pine for sawtimber. Heavy stands can be found on state-owned land within the forest preserve but these are not available for timber harvesting. The last of the old-growth hardwood sawtimber has just about disappeared. The second growth is mostly still too small to harvest except for pulpwood. The wood-using industries face growing difficulties in timber supply and must adapt their practice to using smaller sizes and lower quality material.

The region generally is dominated by seasonal economic instability. Vacationists crowd the Adirondacks in summer with brief returns during fishing, hunting, and skiing seasons. Limited economic opportunities prevail throughout the remainder of the year. Increased timber output could do a great deal to help maintain the local economy. At the same time it would add to the prosperity of the state's forest products industries. New York has some 1,700 sawmills, 48 pulp mills, 70 paper and paperboard mills, and 1,300 secondary wood-processing plants that produce a variety of diversified articles. These industries depend on both domestic wood and that shipped in from out of state. Together with the construction industry, they provide a ready market for New York timber and pay a total freight bill in excess of some 50 million dollars annually on lumber shipped in from outside. Forestry efforts are unlikely even to come close to meeting New York's own timber requirements, nor is it deemed desirable to attempt this. Still the state's economy could be improved by managing its forest resource more effectively.

The story related above is not a flattering one nor does it attempt to do justice to the many progressive steps New York State has taken in forestry, including the forest preserve, protection against fire, insects, and diseases, encouragement of private forest planting, the retirement of submarginal agricultural land to forests, and the encouragement of private forestry through the Forest Practice Act, farm forestry, and conservation practices aimed at increased game populations. Still less has been written of important private developments.

It is a mark of mature people that they face their difficulties squarely and set about studying how they may be overcome. What lessons may we draw from New York's experience and outlook? First, a clearcut long-run policy on forest land use could be a valuable asset to the state. Despite over 60 years of forestry a clearly visible long-range and comprehensive program is not evident on the land. Instability of landownership and use prevents long-range fulfillment of initial efforts. Many limited objective programs have seemed to impede as much as promote comprehensive adjustments leading to long-range stability. The same type of opportunism that led to land clearing and timber exploitation in the early history of the state is leading to Christmas tree planting and soil bank planting today. Seldom has the planting of trees on private lands been followed by proper subsequent care and maintenance. The future outlook for forest crops still seems uncertain to the average small forest owner. Additional steps appear necessary but what they should be and how they should be taken are not so evident.

One method of getting stability in land use is to fix it by basic law as in the case of the forest preserve. Another legislative measure adopted in some states is to authorize zoning. Both imply a degree of inflexibility that cause the state to hesitate invoking their general use. Moreover, it is believed that society is best served if it maximizes the opportunities for multiple use of land where such uses are basically consistent.

Some interesting examples may be found in various sections of the state. One of especial interest is a private project involving forest plantation for timber and Christmas trees surrounding artificial lakes for swimming, hunting, boating, and fishing that are leased to a private club. Such imaginative development enables this land, abandoned for agriculture, to meet the needs of a growing population for outdoor recreation and for products of the forest. Such multiple use may offer the best opportunities for achieving the basic stability needed during this era of change. It also gives promise of satisfying the largest numbers of people, thereby limiting the likelihood of successful political action by groups seeking limited use.

Clear policy requires good forecast of demands for forest products and services and also of the potential productivity of forest lands under good management concerning which distressingly little is known. Some of the fertile sandy soils, well-stocked with vigorous white pine can produce currently up to 1,000 board feet per acre annually. Steep, rocky slopes, on the other hand, may never produce any commercial timber. Whatever forestry efforts are applied to such lands will have to be justified on the basis of improving streamflow, wildlife habitat, and recreational use rather than timber growth. Between these two extremes are all

gradations in quality of soil and values of annual timber growth. A vast increase in knowledge of this land and its potentiality should precede any efforts at zoning or legislative determination of land use. Meanwhile, fragmentation of holdings seems to be proceeding at a more rapid rate than consolidation is building up economic-sized ownerships. Extravagant use of land for rural residences and other single purposes might be curtailed by zoning, regulation of land use through other legislative acts, or by a substantial increase in price of forest land brought about by vigorous bidding among well-financed timber holding companies. This brings up the role the state should play in extending public holdings of forest land for timber production, watershed protection, and public recreation.

The problems that press on New York's forest lands seem likely to press also on the forest lands of other thickly settled regions. The future of forest land cannot be established without careful thought to the future pattern of industrial and population growth throughout the land. If, as some believe, this growth will be concentrated in the zones where population is already heavy, with extensions along major highway, water, and rail transportation routes, the problem in the rest of the country may be less acute. To project a long-term pattern of forest land use in the zones destined for heavy population increase is going to take much more guiding than the present individual owners can give. Forestry may, to be sure, represent a reasonable speculation in such zones having in mind that more intensive use in the future may permit of land disposal at a substantial profit. This, however, is not meeting the problem of forestry and may, in fact, result simply in social waste if lands are planted to trees that are later cleared for factory or town sites before the trees reach merchantable size.

The profession faces today both bright prospects and difficult decisions. Land use is in a state of flux which affects present and future forestry. Forests are besieged on the one hand for highways and building sites, parks, and recreational lands; on the other, they are being taken up for rural residences and further subdivided. Use of the timber that is growing on the land today will be greatly handicapped by fragmentation in holdings and multiplicity of policy and use. The profession has the obligation to be alert to what is going on and to seek to inform and guide its clients, be they private or public, towards policies that will lead towards stability and high economic return and satisfaction from the land. No more valuable contribution can be made to future forestry than determining today the principles that can lead to stabilized forest land use.

HARDY L. SHIRLEY

State University College of Forestry at Syracuse University

MEETINGS OF THE
SOCIETY OF AMERICAN FORESTERS

Year	Dates	City	Attendance[1]
1900	Nov. 30 and Dec. 13 (organizational meetings)	Washington, D. C.	7
1901	4 executive, 11 open meetings	Washington, D. C.	—
1902	4 executive, 10 open meetings	Washington, D. C.	—
1903	6 executive, 12 open meetings	Washington, D. C.	—
1904	9 executive, 18 open meetings	Washington, D. C.	—
1905	5 executive, 8 open meetings	Washington, D. C.	—
1906	6 executive, 7 open meetings	Washington, D. C.	—
1907	4 executive, 10 open meetings	Washington, D. C.	—
1908	5 executive, 13 open meetings	Washington, D. C.	—
1909	2 executive, 9 open meetings	Washington, D. C.	—
1910	2 executive, 6 open meetings	Washington, D. C.	—
1911	2 executive, 8 open meetings	Washington, D. C.	—
1912	2 executive, 12 open meetings	Washington, D. C.	—
1913	2 executive, 9 open meetings	Washington, D. C.	—
1914	6 executive, 8 open meetings	Washington, D. C.—13 Ithaca, N. Y. — 1	—
1915	12 meetings	New York City — 1 San Francisco — 1 Washington, D. C.—10	—
1916	Jan. 22 (annual business and open meeting)	Washington, D. C.	67
1917	Dec. 31-Jan. 1, 1918 (with AAAS)	Pittsburgh, Pa.	20
1918	Dec. 27-28 (with AAAS)	Baltimore, Md.	48
1919	No record of meeting, probably because of World War I		
1920	December 20	New York, N. Y.	—
1921	December 27-28 (with AAAS)	Toronto, Ont.	101
1922	December 26-30 (with AAAS)	Boston, Mass.	128
1923	December 27-28	Baltimore, Md.	89
1924	December 30-31 (with AAAS)	Washington, D. C.	182
1925	December 16-17	Madison, Wis.	90
1926	December 29-30 (with AAAS)	Philadelphia, Pa.	130
1927	December 16-19	San Francisco, Calif.	255
1928	December 28-29	New York, N. Y.	166
1929	December 30-31 (with AAAS)	Des Moines, Iowa	—
1930	December 29-31	Washington, D. C.	325
1931	December 29-31 (with AAAS)	New Orleans, La.	—
1932	December 14-18	San Francisco, Calif.	287
1933	December 28-30	Milwaukee, Wis.	250
1935	January 28-30	Washington, D. C.	—
1936	January 27-29	Atlanta, Ga.	470
1936	December 14-17	Portland, Ore.	488
1937	December 16-18	Syracuse, N. Y.	466
1938	December 15-17	Columbus, Ohio	385
1939	November 23-25	San Francisco, Calif.	420
1940	December 19-21	Washington, D. C.	535
1941	December 18-20	Jacksonville, Fla.	350
1942-1945	No national meetings held because of World War II		
1946	September 14-17	Salt Lake City, Utah	400
1947	December 17-20	Minneapolis, Minn.	400
1948	December 16-18	Boston, Mass.	600
1949	October 11-14	Seattle, Wash.	800
1950	December 13-16	Washington, D. C.	1,250
1951	December 12-15	Biloxi, Miss.	1,113
1952	November 17-20	Montreal, P.Q.	800
1953	September 14-17	Colorado Springs, Colo.	750
1954	October 24-27	Milwaukee, Wis.	831
1955	October 16-19	Portland, Ore.	1,417
1956	October 14-17	Memphis, Tenn.	1,333

[1]In most cases where attendance figures are given they include members and guests.

(*See the President's column, page 788*)

Education for Forest Products Leadership[1]

George A. Garratt
Dean, Yale University School of Forestry, New Haven, Connecticut

EDUCATION IN FOREST PRODUCTS as it pertains to the various aspects of production, distribution, and use, and to research and development has been largely reserved to our forestry schools, due in no small measure to the failure of engineering and other technical institutions to embrace the opportunities for training men in this field. Precise instruction in forest products, involving a specified series of pertinent required courses, was initiated at one institution as early as 1910, and comparable programs were undertaken by a number of other forestry schools in the following decade. However, this early instruction was essentially part of the established forestry curriculum, and it was not until some time later that separate curricula, designed for the specific technical training of men in wood technology and utilization, became an accepted part of the forestry school program. Nevertheless, it is worthy of note that the early instruction in forest products, fragmentary as it may have been, led more than a few of our older forestry graduates into successful careers in the forest products industry. In fact, a significant number of the men being trained in general forestry are still finding a suitable outlet for their talents in the products field, as indicated in a recent report from an undergraduate school in the Northeast.[2] Analysis of the employment of all the forestry alumni of this institution, which has never had a specialized wood technology or utilization curriculum, indicates that an average of one out of every eight graduates is working today in the forest products industry, chiefly in manufacturing and distribution.

Attached, as it has been over the years, to schools primarily concerned with instruction in forest management and administration, professional training in forest products experienced a slow and often uneven development over a rather extended period. It remained for the unprecedented post-war expansion of the forest industries, and the attendant stimulation of technical employment and research, to bring about the distinct metamorphosis that has characterized education in this field over the past decade. The earlier, more general instruction has been extended and intensified, giving rise to a variety of distinctive and specialized curricula and even to separate departments of forest products, wood technology, and forest utilization. Today, no less than 23 of our forestry schools have programs of study specifically directed toward specialized training in forest products. By way of contrast, less than half that number of American architectural, chemistry, and engineering schools and technical institutes offer undergraduate or graduate programs that can be considered as specifically related to education in this field. Only in the area of pulp and paper technology does there appear to be a realistic trend on the part of the nonforestry institutions toward major participation in forest products instruction and related research. The Hugh P. Baker Laboratory offers outstanding evidence of the role the forestry schools are coming to play in meeting such educational opportunities and responsibilities.

Careers in Forest Products

The extent and diversity of present-day employment of forest products specialists is indicated in a recent survey of the occupations of 192 graduates of wood technology, utilization, and forest products curricula, representing 27 colleges and universities in the United States.[3] This sample comprised men who had received their B.S. degrees since 1934, but predominantly between 1946 and 1955, and it is of interest to note the apparent importance they attached to graduate work, with 43 percent of the group holding advanced degrees. About the only employment pattern to be noted from the survey was that the more actively developing segments of the industry employed proportionately more of these technically trained men. The larger companies engaged in primary manufacture of lumber, pulp and paper, and veneer and plywood accounted, collectively, for 42 percent of the employment, while 20 percent of the men were connected with service-type organizations—associations, public agencies, educational institutions, and research organizations. There was more limited representation among wood products manufacturers, chemicals and allied industries, furniture manufacturers, and fiber and particle board manufacturers, in that order.

With reference to the principal duty functions of this group of forest products specialists, sales headed the list (22 percent), followed by research (21 percent), management and supervision (16

[1]Presented at the dedication of the Hugh P. Baker Laboratory, State University College of Forestry at Syracuse, May 2, 1957.

[2]Beyer, Frank D. Does the general forestry curriculum satisfy the training needs of the forest products industry? Forest Products Jour. 7(3):25A-26A. March 1957.

[3]Ellis, Everett. Wood technologists in the forest products industries. Forest Products Jour. 7(2):72-74. February 1957.

percent), and engineering (11 percent), with several other classifications at less than 10 percent each. However, if research is combined with development and promotion, this category will represent the largest single component of the group (29 percent).

A separate survey of the current occupations of 76 wood technology graduates who received advanced degrees (master's and doctorates) from a single institution over the past 11 years pointed to a somewhat comparable diversity of employment. Approximately one-third of the men in this sample are now engaged in research and development; one-fourth in production, including management and supervision; one-fifth in sales and promotion; and one-sixth in education. The detailed data from which these summary figures were drawn reveal the fact that approximately one-third of the men in the production classification have already attained substantial managerial positions, despite their relative youth, perhaps indicative of the present-day opportunity for qualified men to attain positions of leadership in the forest products industry.

Forest Products Curricula

The developments in our educational process which have come with the years were imposed initially upon the classical course of study generally adopted by the faculties of the early forestry schools, who recognized three basic attributes of a professional curriculum: (1) general education to prepare the student for the responsibilities he shares with all his fellow men; (2) thorough preparation in the natural sciences basic to forestry; and (3) adequate training in pertinent technical subject matter. With the passing years, new curricula were conceived in a wide variety of specialized areas, including wood technology, utilization, and other aspects of forest products, and these were established within the general framework of the existing educational structure. This was done essentially by deleting more and more forestry subject matter from the prescribed course of study, until today these specialized curricula bear little or no resemblance to, and have little or nothing in common with, the conventional forestry program from which they originated.

The continued accumulation of technical knowledge in wood technology and utilization and in associated scientific and engineering fields has made available an ever-increasing wealth of factual information applicable to professional training in forest products, and pressure is constantly exerted on our schools to increase the time devoted to existing technical courses and to add new ones. With most of the specific fore try course already squeezed out of the forest products curricula, the resultant tendency has been to expand the technical instruction at the expense of the basic science courses and especially such subjects of cultural value as may have escaped prior elimination. In some cases, the opening up of new areas of employment has led to fragmentation of even the specialized forest products programs, by the device of establishing splinter curricula, thereby further reducing what breadth of education there may have been in the original curriculum.

The inevitable result of crowding more and more specialization into the forestry and forest products curricula has been a distinct trend toward vocational training. This has been abetted by pressure from several sources to make the instruction more and more practical, in order that the graduates may sooner and more effectively adapt themselves to the beginning jobs they seek. One of the justifiable major criticisms levelled in recent years at our educational program in forest products is that, far too generally, our schools have been training men for subordinate jobs without really attempting to equip them to meet future opportunities for advancement into positions of major responsibility. In many cases, where graduates have so advanced, it has been as often by dint of their native ability as by virtue of their specialized educational experience. What is needed in our present-day educational program is a strengthening of the concept of "Education for a Profession" rather than that of "Training for a Vocation."

Executives in the forest products industry, faced with ever-increasing need for men with qualifications for leadership, are more and more frequently adding their voices to the increasingly outspoken condemnation of extreme specialization and vocationalism being expressed by many of our educators. And yet, the extremes to which some of our schools have gone in shaping their curricula to the immediate employment needs of new graduates are often the result of the attitude of the employers themselves. Despite top management's avowed concern for men with a broad academic background, the men in industry who actually do the hiring (and the firing) more often than not will favor the graduates who can do most effectively the immediate job to which they are to be assigned. A point to be made is that, while industry executives may be inclined to put relatively little weight on vocational skills that can readily be acquired on the job, educators cannot overlook the important fact that the entering jobs, which will determine a young man's initial success or failure, will generally involve some technical and applied skills of a vocational character.

The consequence of the growing opposition to the present emphasis on specialization in many professional fields, including both forestry and forest products, has been a strong reaction in favor of increasing standards in general education. This points to a return to a rational combination of general and special education that will give consideration to appropriate instruction in the natural sciences, social sciences, and humanities, and also emphasize those technical aspects of the course of study that

are really essential to professional competence. How such a strengthening of the basic attributes of the curriculum is to be accomplished within the time limits of a four-year undergraduate program is one of the major problems facing educators in professional fields today.

From the professional viewpoint, there is an element of danger implicit in any marked swing toward general education if this be at the expense of adequate technical training. The emphasis now being directed toward developing social skills should not lead to any slighting of the over-all importance of the technical or professional skills. Naturally, the capable manager must acquire and develop the art of leadership, but this must be grounded on a solid, high-quality technical foundation. Schools in particular must avoid turning out men comparable to a physician who has a splendid bedside manner and is a leading wheel in the county medical society, but who lacks sound training in anatomy and physiology.

It is a generally accepted truism that the inherent quality of the individual is the basic, and perhaps the decisive, factor involved in the success or failure of a man, either in a purely professional career or in a managerial position. Given a good man, with the capacity for continuous growth, and the precise details of his training, in school or on the job, are likely to be of minor importance in his progress in industry. But even the best young man should be impressed with the fact that his professional competence will be his chief stock-in-trade for many years. In our educational process, we should be concerned not with the issue of general leadership capacities versus technical competence, but with seeking out men who have the potential for both, and providing them with an environment conducive to professional growth.

Qualifications Sought by Industry

In the light of present-day employment opportunities in the forest products field, it is interesting to consider the qualities and attributes that industrialists are seeking in the wood technologists and other forest products specialists they employ. It may be taken for granted that the graduate will possess the skills which qualify him in his calling, since the imparting of such technical competence is the primary function of the professional curriculum. The employer may also expect that the training the young graduate has had is based on a firm foundation of relevant science, engineering, and economics. Beyond that, it would appear that the industrialists who are looking ahead to their need for future managers and executives are becoming increasingly concerned with men who are trained primarily in fundamental principles rather than in the practical aspects of the job; men who are able to approach the problems of the industry with a critical and analytical mind, rather than those who are dogmatic in their thinking and consider that they know all the answers. Companies are also seeking men who have the ability to deal intelligently with people, for as industry assumes greater social responsibilities, effective handling of the human relations aspect of the job becomes particularly important in the work of managerial and executive personnel. It is noteworthy that after men reach supervisory positions, their further advancement may well depend more on their ability to work with others and to manage people than on their technical knowledge. Above all else, companies are seeking men with breadth of vision for the present and the future; men who have the urge for continued self-education, aimed at keeping abreast of technical and public relations developments in the industry and in related fields, and who posses the capacity, as they mature, to grow and develop from technical specialists into managerial generalists. The men who are being sought with increasing intensity are those who have the training, ability, and vision to grow in their companies so they may one day be fitted for top executive positions.

Employers are placing increasing emphasis on the vital importance of communications skills—both oral and written. Time and time again, we have all heard college students and graduates criticized for their inability to write and speak effectively, often with the implication that our profession as a whole represents a rather low degree of communications ability. My personal concern in this regard has at least been tempered by reports from my fellow deans in engineering, medicine, and other professions indicating that the same lack of facility with the English language is a common criticism of their students and graduates. This does not excuse the deficiencies of our own group, but at least it should make us feel less lonesome.

Ineptness in speaking and writing appears to be a fault, not of forestry and forest products education in particular, but of our basic educational system. While our professional curricula and our faculties may be of some help, more especially at the graduate level, solution of the problem for any individual is largely up to the man himself, involving not only the recognition and admission of the shortcoming, but also his willingness and determination to attain self-improvement through the application of whatever remedial measures there may be at hand.

Equally as important as the acquisition of factual knowledge and the understanding of scientific principles and techniques is the development in the student of such mental qualities as curiosity, thoroughness, imagination, and ingenuity. The critical and analytical attitude of the inquiring mind is as essential to the success of the practicing forest products specialist as it is in research and teaching. It is not the purpose of this paper to detail the other personal qualities indicative of potential success in attaining leadership, other than to point out that such attributes as emotional sta-

bility, integrity, initiative, adaptability, and responsibility, to name just a few, are basically inherent in the individual. These essential qualities cannot be developed by the device of "taking a course" any more than it is possible to develop leaders by providing a course in "leadership." In their day by day work, however, the individual faculty members can do much to encourage the development of desirable mental attitudes in responsive students. A point to be made in this connection is the opportunity and responsibility that confronts our colleges in screening the students they may select for leadership training.

This may be a fitting point at which to emphasize the fact that only a restricted number of our graduates will attain positions of recognized leadership in the forest products industry. This, by virtue of the dual circumstance that not every student and graduate is a potential leader of any sort, and that there are only a limited number of managerial and executive positions to be filled in any organization. In the normal course of events, these top positions will go to the more gifted individuals who have inherent abilities to lead and who assiduously set about to develop such skills to the limit of their capacity. The men destined to become leaders in the industry will be those who have breadth of outlook, who develop a personal fervor and dedication to the purposes of the industry, who have the capacity to understand the many facets of the business, and who can develop an appreciative concept of their organization's basic philosophy.

The Role of Graduate Training

The increased attention being devoted to the need for a more general education, coupled with a more comprehensive professional training than can be encompassed satisfactorily in a four-year undergraduate curriculum, raises a pertinent question as to the role of graduate work in education for forest products leadership. It may be well and effectively argued that the primary function of undergraduate work should be essentially that of providing a sound basic education, with specialized training the particular purpose of graduate instruction. Specialized work belongs in the graduate rather than the undergraduate realm, since it requires more mature thought, more specific and detailed programs of study tailored to individual need, more experienced instructional personnel, and more adequate provision for special project work and for research. The experience of older foresters, engineers, and other professional men generally, argues convincingly against the philosophy of premature specialization, especially for the man who aspires to a position of leadership.

Graduate training should have a particularly significant place in such an educational program as we are considering, since it offers a realistic opportunity for selectivity, in admitting those individuals who, in their undergraduate work, have demonstrated both high academic achievement and distinctive qualities of leadership. Obviously, it is not as feasible at the undergraduate level to single out the more promising students at the outset of their academic experience and carry them through a special curriculum apart from the other students.

Because it is so succinctly expressed, I have borrowed the following statement by the newly appointed dean of the Duke Forestry School: "The graduate student, unlike the undergraduate who is carefully nurtured through four years of prescribed course work, spends an ever increasing amount of his time working independently of others. He is encouraged in logical and creative thinking and while he is frequently counseled, he must develop initiative and resourcefulness. In fact, his success or failure in graduate pursuits is largely dependent upon his personal achievements, and the judgment he exhibits in the planning, development and execution of his work."[4]

Industry's Responsibilities

The development of future leaders in the forest products field is by no means the sole responsibility of our colleges and universities, but one which must be shared to the fullest extent by industry itself. If the forestry schools are to do the most effective job in providing their students with sound technical training, the companies in which their graduates seek employment must supplement this academic preparation with an appropriate "training-within-industry" program. The survey to which I referred previously (Ellis, *loc. cit.*) indicates a relatively low level of present, industry-wide, on-the-job training in forest products which is presumed to point to a "lack of recognition on the part of many employers of the necessity for (supervised) training and indoctrination for the recent graduate." Establishment of effective on-the-job training programs by the various segments of the forest products industry will do much to relieve the pressure on our schools for continued vocational-type instruction.

Research in Forest Products

Any consideration of strengthening technical training in the field of forest products must give full regard to the importance of research in the program of professional education, especially at the graduate level. The interdependence of graduate instruction and research is such that the educator who fails to keep abreast of the latest developments in his particular field of interest and in related areas must surely fail in his responsibility to his students. Obviously, one of the most effective ways of stimulating good standards of scholarly attainment on the part of faculty members is through their active association

[4]Harrar, E. S. Graduate training in forest products technology. Proc. Forest Products Research Soc., 5:129-130. 1951.

with challenging investigative programs, not only in direct personal participation but, perhaps even more importantly, in guiding the research of a group of highly qualified graduate students.

Any school which so overloads its qualified research-minded faculty members with teaching, or in other ways prevents them from developing and carrying out effective investigative projects in their particular specialties, not only robs such instructors of needed intellectual stimulation, but also denies them appropriate professional recognition and advancement. Such a school is destined to become a second-rate institution in today's educational competition. The same fate is in store for the school or department that fails to attract to its faculty a reasonable number of men with a natural aptitude for research.

The existence of a modern forest products laboratory, operated in conjunction with an educational program, is a definite stimulus to good standards of both graduate and undergraduate instruction and those institutions possessed of such facilities are in an especially fortunate position. However, no array of splendid facilities should divert our attention from the main resource for research: people. Our laboratories will be staffed by men and women and they, rather than the imposing equipment, will be responsible for training other individuals for careers in research and for other types of leadership in the forest products industry.

Most of our laboratories contain equipment of a complexity and precision undreamed of when instruction in forest products was being established. This very complexity presents a danger to the teacher and student alike: The temptation to allow training to degenerate into a kind of vocationalism in which the student remains at the level of the technician, at best becoming the half-master of the machine. To say this is to cast no aspersions on the status or importance of the technician in our society. Yet the need for leadership—for truly creative work in wood technology and utilization—can be satisfied only by those whose basic training is broad and deep enough so that they are the masters, rather than the servants, of techniques. This requirement offers the highest challenge to the intellect and drive of our students and to the catalytic abilities of our faculties.

We cannot be satisfied with the graduate who has mastered the operation of a laboratory Fourdrinier machine at the expense of a basic understanding of wood fibers, or who becomes an apparently accomplished dry-kiln operator without a clear comprehension of fundamental wood-moisture relations. Nor do we encourage students to become experts in statistical quality control without first learning something of the technological nature of what they may attempt to control.

"Post-Graduate" Education

As the scope of his supervisory duties increases into real managerial responsibility, and perhaps even before them, the forest products technologist must deal with fields outside the specialty for which he was trained—fields in which he probably cannot hope to become technically competent. However, he should gain a reasonable understanding of these specialties, if he is to have the maximum potential for directing the work of the men he supervises. If the manager is to make a smoothly functioning team out of people with various skills, if he is to be able to appraise the different viewpoints and talents under his direction, he must have not only the capacity to manage men, but also at least some comprehension of the fields they represent.

This circumstance reflects the need for special adult educational opportunities, such as those in general management areas being offered today in various colleges and universities throughout the country. It suggests a real opportunity and challenge to our forestry schools to make a significant contribution in this sphere of "post-graduate" education, through the media of short courses, seminars, institutes, conferences, and other forms of specialized instruction. I am speaking here, not of the vocational-type short courses in kiln-drying, lumber grading, and the like, which are already well-established "extension" activities in some of our forestry schools, but of instruction related to general management problems, new developments in wood technology, industrial engineering, business administration, labor relations, public relations, and perhaps even to effective speaking and report writing, to name but a few of the recognized areas of need.

Conclusion

In closing, I should like to emphasize the point that it is not just in technical fields that new bandwagons roll off production lines with regularity. Each new undergraduate generation seems to be accompanied by some nontechnical touchstone, advanced as indispensable to success. Communications skills, a knowledge of accounting and personnel management, an affable "team-type" personality—these and other traits of training or behavior are promoted and sought after today. Their significance to a successful career in the forest products industry is generally acknowledged. But, in our educational process, they should in no wise be regarded as substitutes for technical competence.

Obviously, we can neither blindly accept nor blithely ignore new fields and attitudes merely because they are new. Proper balance is what is needed in evaluating the true significance of these innovations, and I suggest that educators in the forest products field should steer a deliberately conservative course in striking this balance, in the face of the many pressures pushing us toward extremes. We should not give ground on the fundamental aspects of our educational program, for that is where leadership training obviously lies—in so far as the schools can do anything to develop or encourage effective leadership.

Whatever the precise content of our professional curricula may be,

it is imperative that our program be such as to attract a fair share of the most promising young men in the country, and then to equip them as adequately as possible for a life work in their chosen profession. To that end, our educational program must be dynamic, geared to the constantly increasing standards of general as well as professional education, and responsive to really important shifts in methods, policy, or emphasis, brought about by economic conditions, new scientific developments, or other causes. If forest products training is to meet the challenge of the present and the future, it must be clearly established on the professional, not the vocational, level. These are matters which call for the attention of both industrial leaders and educators concerned with forest products education.

Influence of Land Use on Time of Soil Freezing and Thawing in the Northeast

Richard S. Sartz
Northeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture

DURING THE WINTERS of 1950-51 and 1951-52 the Northeastern Forest Experiment Station made an extensive study to determine the occurrence, type, and depth of soil freezing on agricultural and forest lands in the Northeast. Frost types and depths were determined twice a week on 11 to 16 open land and forest land plots at each of six locations. Four points per plot were sampled at each visit.

This is a report on one aspect of the study: the difference between open land and forest land in the time of soil freezing and thawing.

The study substantiates, in part, what was found by earlier investigators: that land use affects the time when the ground freezes in the winter and when it thaws in the spring. Both Belotelkin[1] and Kienholz[2] showed that forest cover delayed freezing; that hardwood forests were frost-free when open lands were still frozen; but that frost persisted in softwood forests after it had thawed on open lands. Neither Belotelkin nor Kienholz defined the term "frost," but one would infer from their papers that they were speaking of hard-frozen ground—so-called concrete frost. This is the meaning of the term as used in this paper. Concrete frost, in contrast to other recognized forms of soil frost, is relatively impermeable. Under certain rainfall and snow-melt conditions, it causes surface runoff that can contribute substantially to spring flood flows.

While the results presented here are similar to those reported by Belotelkin and Kienholz, the study from which they were obtained was much broader. Their studies were made on a few plots at one area. This study was made on a number of plots in south-central Maine, northern New York, south-central New York, northwestern Massachusetts, and northeastern Pennsylvania. (A sixth area, in central New Hampshire, was not used because there was practically no frost either year in any of the forest-land plots. This was due to the continuous and heavy snowpacks which built up before frost could form.)

To simplify analysis, the plots were grouped into three land uses: open land, softwood forest, and hardwood forest. The number of plots in each group at each location is given in Table 1. Open land plots were bare cultivated, hay land, good pasture, and poor pasture. Both softwood and hardwood groups included a number of different age-stocking classes, from young pole-size stands to mature sawtimber. All hardwood plots were in natural stands, whereas the softwood plots were in both natural stands and plantations. Almost all the softwood types found in the region were represented.

Method of Analysis

The analysis was limited to a simple comparison of the times at which the first and last frosts were found, regardless of whether the frost had been continuous or only intermittent between the first and last occurrences.

Elapsed times in days from the date of the first frost observation on the bare cultivated plot to the date of the first frost observation on any other plot were computed. Values for the last frost were compiled in the same way. Later dates were given positive values; earlier dates, negative values. For example, if frost were first found on a particular plot 10 days after it was first found on the bare cultivated plot, the comparative value for that plot would be 10. If on an-

TABLE 1.—NUMBER OF PLOTS IN EACH LAND-USE GROUP, BY AREAS

Land-use group	Maine	Mass.	Northern New York	Southern New York	Pa.	All areas
Open land	4	4	4	4	3	19
Softwood forest	5	5	5	4	3	22
Hardwood forest	1	4	3	3	4	15

[1]Belotelkin, K. T. Soil freezing and forest cover. Amer. Geophys. Union Trans. 1941 (Part I): 173-175. 1941.

[2]Kienholz, Raymond. Frost in forest and open in Connecticut. Jour. Forestry 38: 346-350. 1940.

Table 2.—Number of Days From First Frost on Open Land Plots To First Frost on Forest Land Plots

Forest type and year	Maine	Mass.	Northern New York	Southern New York	Pa.	All areas[1]
Softwoods						
1950-51	4	6	7	12	40	11
1951-52	26	11	-1	8	53	17
Both	15	9	3	10	47	14
Hardwoods						
1950-51	21	6	27	34	43	26
1951-52	58	59	25	25	53	44
Both	40	32	26	30	48	35

[1]Weighted averages.

Table 3.—Number of Days From Last Frost on Open Land Plots To Last Frost on Forest Land Plots

Forest type and year	Maine	Mass.	Northern New York	Southern New York	Pa.	All areas[1]
Softwoods						
1950-51	6	9	-8	29	7	8
1951-52	8	14	7	22	10	12
Both	7	12	0	26	8	10
Hardwoods						
1950-51	-6	8	-39	1	0	-6
1951-52	-21	1	-4	-2	-2	-3
Both	-14	4	-22	0	-1	-5

[1]Weighted averages.

other plot the first frost were found 5 days earlier than on the bare cultivated plot, its value would be -5.

Elapsed times were worked up for each plot for both years of record. Average values for each of the land-use groups by years and locations were then computed by adding algebraically the respective individual plot values in each group and dividing by the number of plots. In computing the open-land group averages, bare cultivated plots were given a zero value. Land-use group averages for all locations (weighted by number of plots) were similarly computed. To relate the forest land groups directly to the open land group as a whole, the open land group values were subtracted from the respective forest land group values.

Results

The results are given in Tables 2 and 3. The averages for all areas are also shown graphically in Figure 1. The all-area averages are not averages for all plots sampled inasmuch as those plots that had no frost (New Hampshire) could not be included in this type of analysis.

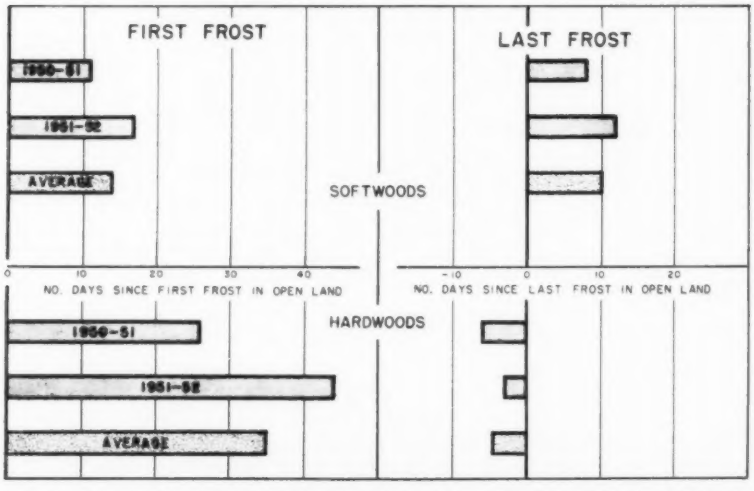


Fig. 1.—Comparative times of first and last frosts in softwood and hardwood forest, as compared to open land.

The 2-year group averages show that concrete frost began to form in the softwoods from 3 to 47 days after the ground began to freeze in the open land, and in the hardwoods from 26 to 48 days after. The weighted averages for all areas analyzed were 14 days later for softwoods and 35 days later for hardwoods.

Although individual plot values showed extreme variation due to differences in microclimate, soils, snow cover, and sampling error, most of the values were in the same direction: of the 22 softwood plots, 16 froze at a later date than the open land plots the first year and 17 at a later date the second year. Of the 15 hardwood plots, all but one froze at a later date than the open land plots the first year, and all froze at a later date the second year.

The 2-year averages for the last frost in softwoods ranged from 0 to 26 days with an over-all average of 10 days. By individual plots, 17 of the 22 thawed after the open land plots the first year and 21 the second.

The hardwood values were less consistent. The range was from -22 to 4 (frost left the hardwoods from 22 days *before* to 4 days *after* the open land); the over all average was -5. Of the 15 hardwood plots, only 8 thawed after the open land plots the first year, and only 6 after the open land plots the second year.

Discussion

In summary, open land soils froze before softwood forest soils; and softwood forest soils froze before hardwood forest soils. Open land soils thawed before softwood forest soils, but after hardwood forest soils.

The reasons for the differences are not completely understood. Forest soils retain heat gained in the summer longer than open land

soils because both the forest canopy and forest floor insulate the ground. It would seem then, that because of the greater insulation afforded by a softwood forest canopy, the hardwood forest soil would freeze sooner.

However, the heat that the softwood canopy retains may be more than offset by the daily insolation that it intercepts, in which case the net result would be faster heat loss from the softwoods. Whether the loss would be faster or slower would depend upon the amount of daily insolation during the heat loss period, which would, of course, vary from location to location and from year to year. This may explain why, on the Massachusetts plots, the softwood soils froze at about the same time as the hardwood soils the first year, but 48 days before the hardwood soils the second year.

The difference in freezing time might also be due to humus and soils differences. An analysis of litter and humus depths with respect to time of freezing did not show any relationship; but a difference in the insulating qualities of softwood and hardwood litters could be a factor.

Snow-depth differences, while important later, are not likely to have affected the date of initial freezing. There was little snow on most plots at the time.

Frost persists longer in softwood forests than in open land probably because of a slower rate of heat gain by the soils under softwoods, due to canopy interception of solar energy. Even with less frost to melt in the softwoods, the rate of melt is so much slower that frost lasts longer.

The hardwood canopy is not nearly so effective in delaying thaw as the softwood canopy. Compared with open land, the rate of melt in hardwoods would be slower. However, frost is usually much shallower in hardwoods than in open land. Where the difference in depth is enough to offset the difference in the rate of melt, hardwood forest soils lose their frost earlier. Where the difference is not enough, they lose it later.

Earl W. Tinker (1890-1957)

Earl Warren Tinker, 66, executive secretary of the American Paper and Pulp Association, New York City, died suddenly on August 31 while on a vacation in South Dakota.

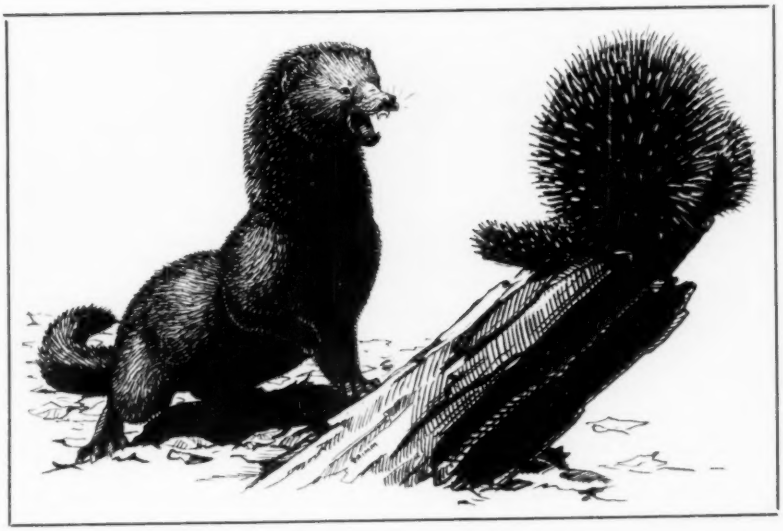
Born in Fenton, Michigan, October 28, 1890, he obtained the B. S. degree in forestry from Michigan State College (now University) in 1913 and the M. F. degree from Yale in 1915.

After brief employment as a forester with the Canadian Pacific Railroad, he entered the U. S. Forest Service in 1915, and worked on various national forests in the West, subsequently becoming regional forester of the North Central Region with headquarters at Milwaukee. Transferred to Washington, D. C. as assistant chief of the Forest Service, in charge of the Branch of State and Private Forestry, he served until 1940, when he resigned to become executive secretary of the American Paper and Pulp Association in New York.

A Member of the Society of American Foresters since 1921, he was chairman of the Central Rocky Mountain Section during 1927-1928. He also was active in the American Forestry Association, the Technical Association of the Pulp and Paper Industry, and numerous others.

The Forest, the Fisher, and the Porcupine

David B. Cook
and William J. Hamilton, Jr.[1]



THE FORESTERS of the Northeast need no reminder of the importance of the natural resources with which they work and of which they are custodians. Nor will they be unmindful of the concept of multiple use, whereby they deliberately try to provide, from the woodlands they administer, raw material for industry, protection for watersheds, and homes for desirable wildlife. The complexity of the ecological unit called "the forest" is very great and its precarious balances are forever being upset, not only by what men do but also by the unpredictable vagaries of the weather and the changing pressures of plant and animal populations.

The forest, the fisher, and the porcupine! Individually, they represent three important and interesting elements in our out-of-doors—collectively, they are three strands in an ecological network whose management seems frequently to get out of hand.

The forest is the dominant plant cover over more than half of New England and New York and this in spite of a dense human population and a high order of industrialization. Besides the usual economic returns, it provides—without cost—many special benefits that only woodlands can supply. Notable among these are homes for all sorts of mammals not classified as game but which live in and are sustained by the forest, sometimes for good and sometimes not.

The fisher (*Martes pennanti*) is one of our largest weasels, a handsome beast the size of a short-legged fox, clothed in a lustrous dark pelt from which it derives the colloquial name of "black cat." It is primarily an inhabitant of "green timber," a situation conditioned by its food habits. Originally, its range encompassed the whole of the northern forest, from coast to coast and extending down the mountains along their strips of coniferous timber. Subsequent destruction of great areas of forest, coupled with the replacement of conifers by hardwoods over much of the remaining timberlands, plus the relentless trapping of the fisher for its pelt, drastically reduced both range and numbers. East of the Mississippi, the species recently became extinct in the Northern Peninsula of Michigan and adjacent Wisconsin. It is now confined to the northern portions of Maine and New Hampshire and to the Adirondack mountains and adjacent areas in northern New York. (Fig. 1.)

The Canada porcupine (*Erethizon dorsatum dorsatum*) is a big, ruggedly built, forest-inhabiting rodent, definitely on the slow and stupid side, but marvelously endowed with a well-nigh impregnable coat of quills. With such a defense it gets a wide berth from most potential predators and so finds no need for wits or speed. While interesting to the nature lover and the sentimentalist, it is entirely devoid of any positive economic value—no usable pelt, no tasty flesh, nothing. The oft-repeated fable that the porcupine should be preserved as an emergency food for lost persons is ridiculous. What hunter, lost in the woods, bereft of judgment and filled with panic, could kill this beast, safely up a tree or down a rock hole! To be sure, the meat is edible, but no one lost in the woods could be sure of finding a porcupine when needed, and reducing one to a meal would be considerable of a trick. On the debit side, there are many and important entries. There is the hazard of stuck-in quills to other wildlife, to dogs, and sometimes to unwary people. The porcupine has a proclivity for gnawing anything that even faintly savors of salt, which makes it a

[1]Respectively, Cooxrox Forest, Stephentown Center, N. Y. and professor of zoology, Cornell University, Ithaca, N. Y. The authors wish to express their appreciation to H. Wayne Trimm of the New York State Conservation Department for the art work.

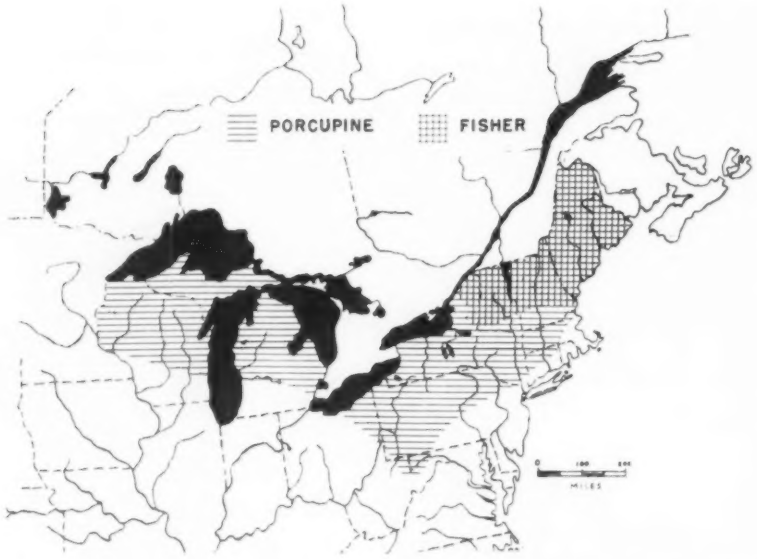


FIG. 1.—Ranges of the porcupine and the fisher in the northeastern United States.

first class pest around camps and especially around unoccupied ones. More recently, porky has acquired a taste for rubber tires, which can be annoying and expensive to both the recreationist and to those who have to be in the woods on business. In the Northeast, where maple syrup is an important forest product porky's newest trick of chewing, the plastic hoses which conduct the sap from tree to central container is costly both in terms of hose destroyed and sap wasted.

The present range of the porcupine includes all of New England and New York, except the coastal area, and most of Pennsylvania west of the mountains. In the Lake States it is found north of the latitude of Saginaw Bay. Its local distribution is largely governed by friction with the human population. (Fig. 1.)

From the northeastern forester's viewpoint, the porcupine's greatest liability is its food habits, for during the colder half of the year it feeds upon evergreen needles and the bark of trees. Defoliation may be so severe as to kill small trees outright and to markedly reduce the vigor of bigger ones. Often, in bad weather, this animal will climb into a treetop to a point where the trunk is six or eight inches thru, find a convenient limb and sit himself down for a spell. By chewing off the bark to right and left the stem may be girdled, causing the top to die and making a stag-head. To trees above sapling size this represents irreparable damage. Then, too, the selective attack upon the conifers tends to accentuate the basic ecological trend towards hardwoods. Around denning areas, the porkies may not bother to climb but will gnaw great patches of bark from small and middle-sized trees at the ground or snow line. Such basal scars afford entry to wood-rotting fungi, so that the trees grow up to be worthless culls. This type of injury directly affects the butt log, which is the most valuable portion of the tree, especially in hardwoods.

New porcupine damage is conspicuous—the snow littered with fresh-cut evergreen twigs; the bright patches of newly exposed wood where the bark has been gnawed off. But, only a few years later, who can tell for sure why the coniferous reproduction is unthrifty, what caused the spike-top, or what let in the rot that reduced a promising sawlog tree to a hollow cull. For every item of damage noted there are dozens that go unseen. And the marks of a single, even brief, eruption of the porcupine population may persist in the forest for a rotation.

Porcupine damage is not confined to the Northeast. In the West, and particularly in that vast territory occupied by ponderosa pine, the yellow-haired porcupine (*Erethizon dorsatum epixanthum*) presents a hazard to growing timber second only to that of fire. In 1955 a survey of porcupine damage to ponderosa pine plantations in the Intermountain Region indicated that only one-quarter of the total plantation area was stocked with planted pines. About one-sixth of the existing planted pine had been killed or injured beyond hope of reaching maturity. Most of the trees were only then entering the period of greatest susceptibility. Extensive damage to lodgepole pine is attributable to this pest; in parts of Oregon, a third of the second-growth timber has been damaged. The great glabrous scars in extensive timber stands of Colorado are evidence of this mischief. When we consider that a single porcupine can and often does damage as many as a hundred trees during a winter, the destructive potential of a high porcupine population is enormous.

In the Northeast, critical damage is scarcely as widespread as in the West, but in areas of local concentration, depredations can be serious. Whenever an especially favorable base of operations is available, porcupine population eruptions are to be expected, with all their attendant evils.

While only a single young one is produced each year, the porcupine's effective enemies are so few and its defense so good that net and gross increment closely approach one another. The proportions which local porcupine populations may reach in the Northeast is indicated by data from New York. The ranger at the Stony Clove Campsite, near Hunter, killed 52 porcupines about his home in one year, chiefly to minimize damage to his dwelling and

car tires. On Slide Mountain, also in the Catskills, one camper shot 34 porkies around his campsite in three days. And such examples can be multiplied indefinitely.

From time immemorial, the hand of the hunter and the woodsman has been against the pestiferous quillpig. More recently, the vacationist has joined in, especially after he has had a tire gnawed to bursting, or lost some item of camp gear to this creature's insatiable appetite. But where people—and particularly permanent residents who work in the woods—are few, porcupines multiply faster than they are destroyed, and soon the woods are full of them. When this occurs the best efforts with trap, gun, and poison seem to do no more than create a population plateau at a rather high level, with proportionately severe damage. The hoped-for extirpation of anti-porcupine campaigns is never achieved.

To get some measure of direct control of this ubiquitous pest, shooting, trapping, and poisoning are in order. It is easy to kill a porky, if one can find it, with a .22 caliber rifle. Many—perhaps thousands—have been disposed of in this manner in the Catskills of New York, yet reduction by this means has had no permanent results. Trapping! Who bothers, except the local residents? Poisoning is against the law in many states, but the porcupine can be decimated with impregnated salt blocks. However, this approach poses a hazard to deer and other wildlife unless the blocks are placed deep in the rocky winter dens or securely fastened high up in the favored "resting trees" commonly used by the western porkies in their seasonal migrations.

The fisher is well established in Maine, fairly common in northern New Hampshire, but reaches its highest numbers in the great wilderness of the Adirondacks, in New York State. Thirty years ago it was considered a rarity in New York, being found only in a few counties and then only in "green timber." Its numbers had fallen so low and the population was so scattered that, in 1937, the species was given complete protection. This brought about a steady increase so that by 1949 a limited trapping season was permitted. While its principal population center is still in the central and western sections of the mountains, there has been a considerable outward spread, so that, in 1957, fisher were taken in eleven counties. During this same period, the animal is reported to have increased in New Hampshire and Maine.

The only really effective control for porcupine is by predation and, to this end, the fisher is marvelously endowed. Not only does it have the speed, size, and power to overtake and overcome the obnoxious quillpig but the quills bother it but little. While some may work into the flesh, most lie harmlessly beneath the skin. One fisher examined by us had a quill part way thru the windpipe but no serious harm seemed to have been done. The fisher is an inveterate foe of the porcupine, perhaps because—even though the risk is considerable—it represents the most food for the least effort. And the control exercised by the fisher on eruptive porcupine populations can be surprisingly swift and effective. Fifteen years ago, in an area of the central Adirondacks in New York, the porky population built up enormously when a big lumbering job was finished, and the camps abandoned. Soon they were so numerous that, in a day's snowshoeing, fifty trails would cross one's path. Then the fisher moved in, and as its numbers went up, those of the porcupine went down. Within three years the quillpig was so scarce that hardly a single track would be met with in a day's travel. The same thing has happened in many places, although seldom so spectacularly, or under such close observation. Testimony from many Adirondack trappers, foresters, and loggers indicates that the reduction of porcupine numbers is a direct result of the increase in the fisher.

In March 1937, Hamilton made a fur survey of five Adirondack counties; saw not one fisher track, but did encounter abundant evidence of porcupines. In March 1952, in the same territory a single porcupine track was observed, while fisher tracks were abundant. From analyses of 130 Adirondack fisher carcasses taken from 1947 to 1957, the decreasing rate of porcupine in the diet of the fisher has been conspicuous. In the Catskills, marked increase in the numbers and damage by this big rodent has occurred because the fisher is absent from this portion of its former range. This much seems sure—up fisher, down porcupine!

New York has managed the fisher, as one of the rarer and more valuable furbearers, with intent to provide annual harvests that would be attractive to the trapper and still insure an adequate seed stock to maintain and increase the species. Since 1949, the legal take has averaged 158 animals a year, with a peak of 230 in 1955. Thirty years ago, the pelt of the female fisher, smaller but finer than that of the male, brought top prices of $150, and that in pre-war dollars. Currently, the fisher holds little interest for the trapper, for pelts fetch only about $5 to $15. In the 1956 season, few skins commanded the top price. Even with optimistic pricing, the largest take would have a cash value of only $3,500. The value of the fisher as a means of reducing the porcupine outweighs this many fold, for certainly those few dollars would not go far in paying for any direct control.

New York's season and bag limits have been conservative enough to increase both the number of fisher and the size of the range. A continuation of this wise policy should bring about an increasingly rapid extension of the area occupied by this animal. If, by natural spread, the range is extended southward, either across or around the heavily populated but narrow Mohawk Valley into the porcupine-infested Catskills, the fisher might well provide a

sharp reduction in porcupine numbers there. Such a situation would not be hurtful to the interests of the hunter, as the fisher's diet seldom includes important game animals. To be sure, a large male fisher is capable of killing a small deer; and while it does feed on the snowshoe hare and the grouse, there is little evidence that it approximates the predation of the red fox on this score, when the two occupy the same habitat. If the fisher succeeds in re-establishing itself in the Catskills of New York or any other area with a surplus of porcupines, especially in places where human control is insufficient, we might reap a return in porcupine control of vastly greater value than the present modest fur harvest. Surely, in such a situation, the fisher would be worth much more alive than dead.

In brief, control of the porcupine over extensive areas of its range is sorely needed. In the past, trapping, shooting, and poisoning have not been effective in reducing the quillpig. No human control practice has demonstrated its worth in the past. We believe that natural control, through the invasion by the fisher of areas occupied by the porcupine, could do much toward resolving this problem. Such natural control through predation by the fisher has been responsible for a marked decline of the porcupine in wide areas of the Adirondacks.

Re-establishment of the fisher in areas of the United States where porcupine control is indicated might well solve, or at least minimize, the damage caused by this obnoxious rodent. We feel that it would be well worth a try.

SCHOOL BOX SCORE
1957 MEMBERSHIP

School	Student applications received: Oct. 1957	Total 1956	Total 1957
Alabama Polytechnic Institute	0	6	19
University of California	0	53	10
Colorado State University	0	28	16
Duke University	0	7	4
University of Florida	0	25	5
University of Georgia	6	30	65
University of Idaho	0	21	15
Iowa State College	0	31	18
Louisiana Polytechnic Institute	0	27	1
Louisiana State University	0	22	19
University of Maine	0	13	18
University of Massachusetts	0	20	2
Michigan State University	0	50	9
University of Michigan	0	24	9
University of Minnesota	0	26	27
University of Missouri	0	2	36
Montana State University	0	17	45
State University of New York	0	38	24
North Carolina State College	0	24	1
Oregon State College	0	44	29
Pennsylvania State University	0	35	29
Purdue University	0	36	2
Utah State University	0	28	5
University of Washington	0	21	16
West Virginia University	0	5	19
Yale University	0	13	5
Totals	6	646	448

SECTION BOX SCORE
1957 MEMBERSHIP

Section	Applications received[1]: Oct. 1957	Total 1956	Total 1957
Allegheny	1	58	64
Appalachian	2	58	25
Central Rocky Mountain	0	32	21
Central States	0	42	11
Columbia River	0	77	53
Gulf States	1	79	43
Inland Empire	1	32	16
Intermountain	1	35	6
Kentucky-Tennessee	0	12	6
New England	1	61	39
New York	0	45	35
Northern California	1	67	19
Northern Rocky Mountain	1	31	48
Ozark	4	19	63
Puget Sound	2	44	50
Southeastern	6	92	108
Southern California	0	2	3
Southwestern	0	2	6
Upper-Mississippi Valley	0	72	49
Washington	0	1	10
Wisconsin-Michigan	2	102	34
Totals	23	963	709

[1]Students, Junior, Affiliate, Associate (Initial) grades only.

Biological Control of Forest Insects in the United States and Canada

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Entomologists are turning more and more attention to the use of parasites, predators, and virus diseases for controlling harmful forest insects.

THE INTEREST in controlling forest insects in this country has increased tremendously during the last decade. Several developments are partly responsible. First and foremost, of course, is the development of the newer insecticides and their satisfactory application by airplanes, mist-blowers, and other modern equipment. Second is the passage of the Forest Pest Control Act in 1947, which authorized a program of forest-insect surveys and provided funds to control outbreaks. Third is the reorganization of the Department of Agriculture, which placed research on forest insects in the Forest Service. And finally, the recent Timber Resource Review made by the Forest Service, states, and other forest organizations, which has shown that insects rank first among the causes of timber mortality.

With this increased interest in controlling forest insects, there has been an increased interest in methods for attaining this objective. The question is being asked: What possibilities does biological control offer? The answer to this question will depend upon one's definition of biological control, upon the species involved and its distribution, and upon the conviction of the person who gives the answer.

The biological-control method was first used against introduced pests; and no doubt biological-control work is primarily thought of as the transferring of entomophagous parasites, predators, and diseases from one part of the world to another. As recently pointed out by Simmonds (*9*), however, biological control properly includes the control of noxious weeds, the use of predacious animals, and — in fact—the control exerted on any plant or animal by biotic factors. Nevertheless, almost all biological-control work with forest insects has been with parasites, predators, and diseases; so this paper will be limited to such factors. Some consideration will be given to native as well as introduced pests.

Past Work

A thorough review of past work on the biological control of forest insects is unnecessary; but some background is desirable, and current work should be mentioned briefly. The method will no doubt have its greatest use against introduced species. Compared with crop insects, we have relatively few introduced forest pests. Probably two-thirds of our agricultural pests are of foreign origin (*3*) but we have only about a dozen serious introduced forest insects, and only seven or eight of them have caused serious tree mortality. Actually some parasites and predators have been released to combat some 15 or 18 forest pests; but several of these can more properly be considered pests of ornamentals or fruit trees than true forest insects, and several others very rarely cause any tree mortality.

There are only nine that can be considered tree killers, and some of these kill rarely. They include three Lepidoptera (gypsy moth, European pine shoot moth, and larch casebearer); three Hymenoptera (larch sawfly, European spruce sawfly, and European pine sawfly); and three Homoptera (balsam woolly aphid, beech scale, and red pine scale). The origin of the red pine scale is unknown, but it probably was introduced.

It is rather generally believed that the gypsy moth is as well controlled by biotic factors in North America as in Europe, but the increased use of insecticides against this pest makes a definite appraisal very difficult. The larch casebearer is heavily parasitized, but it still occurs periodically in outbreak form. The European spruce sawfly is now well controlled by biotic factors, and the European pine sawfly may be satisfactorily held in check by the application of a virus disease. The beech scale is unique in that it kills only when it occurs in conjunction with the Nectria canker. The Canadian government is still studying and importing the natural enemies of the other three species —the European pine shoot moth, the larch sawfly, and the balsam woolly aphid. They are also importing enemies of the winter moth, which is a comparative newcomer, having been discovered in Nova Scotia in 1949.

In other parts of the world relatively little biological-control work has been done against introduced forest pests, although some quite successful examples can be noted. The eucalyptus weevil in South Africa and Mauritius has been successfully controlled by the introduction of an egg parasite; and

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satisfactory results have followed the introduction of a parasite of the golden oak scale in New Zealand, Tasmania, and Australia and the introduction of a parasite of the wood wasp in New Zealand.

Comparatively little has been done against native insects. As for transfers from one area to another, there are a number of widely distributed native species that are affected by different biotic factors in different parts of their range. In such cases there seems to be no logical reason why the introduction of certain parasites and predators from one area to another might not prove worthwhile. For instance, a pupal parasite of the elm beetle, (*Tetrastichus brevistigma* [Gahan]), was successfully introduced in California from the East. Strangely enough, concerted efforts by Canada and the United States to establish certain western parasites of the spruce budworm in the East have so far proved unsuccessful, although the eastern and western forms of the spruce budworm do show some rather well defined differences and, of course, they feed on different host plants. Altogether, work of this type has been rather limited.

On the other hand, a great deal of effort has been put into enumerating and cataloging the various parasites and predators of our native species, and in many cases this work includes life-history studies together with estimates of percentage host population killed, etc. No attempt will be made to review this work, but something along this line has been done on most of our important forest insects, and much of the work is detailed and complete.

Work Now Under Way

Probably the most practical way to discuss current work is to consider the work being done in the United States and Canada separately. The United States is doing comparatively little; Canada is doing a great deal.

In 1939 the United States discontinued the direct importation and colonization of forest insect parasites and predators from Europe. That work has not been renewed. Most of the work on the biological control of forest insects in this country, therefore, is work done on native species. There are about 90 forest entomologists employed by the Forest Service on a full-time basis. Four of them devote most of their time and 12 more devote about one-fourth of their time to study of the biotic factors affecting some 12 major pests.

A serious attempt is being made to evaluate the role of the parasites and predators in spruce budworm infestations in Maine, the Lake States, and Oregon to help determine when insecticidal control should be undertaken. Canada has supplied us with several colonies of European parasites and predators for release in this country, mostly in New England; and their progress is being carefully watched. Trials using virus disease sprays against *Neodiprion sertifer* (Geoff.) and *N. pratti pratti* (Dyar) have proved highly successful. Studies on forest-insect diseases are being initiated at the Forest Insect Laboratory of the Northeastern Forest Experiment Station at New Haven, Conn., with special emphasis on rearing disease-free gypsy moth larvae.

Several states and universities have also made important contributions, such as the ecological study of the forest tent caterpillar by Hodson (*6*) in Minnesota and the encouraging results obtained by Clark and Reiner (*2*), using a virus spray against the great basin tent caterpillar in California.

Canada renewed its work of importing beneficial species in cooperation with the Commonwealth Institute of Entomology in 1948. Their largest project on forest insects at the present time is perhaps the study and importation of balsam woolly aphid predators from Europe. Several have been introduced successfully into New Brunswick and Newfoundland, and their effect on host populations in New Brunswick is being carefully studied.

Importations of beneficial species that attack the winter moth and several other pests are also being made. Some outstanding work is also being done in Canada on the evaluation of the role that specific biotic factors, such as parasites, play in reducing host populations. The use of life tables in this connection by Morris and Miller (*8*) and Miller (*7*) to evaluate the effect biotic factors have on spruce budworm populations in New Brunswick is an outstanding contribution. Canada has also pioneered in its study of insect diseases, and it is hardly necessary to mention the extremely important work being done at their Forest Insect Disease Laboratory at Sault Ste. Marie.

In order to highlight somewhat further a comparison of the amount of work being done on the biological control of forest insects in the United States and Canada, a count was made of the number of scientific papers on this subject that appeared in the *Journal of Economic Entomology* and in the *Canadian Entomologist* during the last 5 years. A sampling of this sort leaves very much to be desired, but for what it is worth the tabulation showed that a total of 1,627 articles or scientific notes had appeared in the *Journal* during the last 5 years and only 11 of them (less than 1 percent) had to do with the biotic factors affecting forest insects. During the same period, 405 articles have appeared in the *Canadian Entomologist* and 35 of them (about 9 percent) are on this subject.

Experience and Results

All this work, whether done in Canada or the United States, adds up to a considerable effort. Results from introducing beneficial species vary all the way from apparently completely successful, as in the case of the European spruce sawfly, to completely unsuccessful, as in the transfer of spruce budworm parasites from the West to eastern infestations. In most cases, of course, results have been somewhere between these extremes.

It would almost seem as if we

had by now had enough experience to determine rather accurately in advance whether or not such introductions would prove worthwhile by the simple process of determining the efficiency of the biotic factors under the various ecological conditions in the native country of the host. This is only partly reliable, however, because the role of an introduced species often differs considerably in its new habitat. Occasionally, too, it is discovered that unexpectedly different biological races of both host and parasite may occur. A good deal of this work is still pretty much on a trial and error basis. It would be folly, though, to ignore the obvious fact that the success or failure of biological-control work depends largely upon the habits of the pest we hope to control.

So far, more successful work has been accomplished against pests with sedentary habits, such as scale insects, aphids, etc., than against other groups. Considerable success has also been achieved against defoliators. However, some of the most injurious forest insects, notably bark beetles and borers, increase to epidemic proportions only when a special type of food becomes abundant. Since their increase appears to be dependent upon food and independent of parasites and predators, there is much less prospect of controlling them by biological-control methods than there is of controlling other groups.

There are also certain pests against which this method is hardly practical, such as vectors of plant diseases, which are very harmful at extremely low population levels. It is also important to keep in mind not only the habits of the host, but also the limitations of the biotic factor. For instance, certain predators — apparently because of low searching ability—are of little economic value until host populations are high.

Exploring the Possibilities

If these rather obvious limitations to the biological-control method are kept in mind, there seems no doubt that it should be used against most introduced pests. The question of whether some aspects of the method can be used in a practical manner against native pests is more difficult to answer. Actually there are not too many possibilities.

The transfer of natural agents from one area to another is bound to be rather limited; and up to now there is little evidence that we can materially increase the numbers and effectiveness of native natural control factors, such as parasites and predators, by large-scale breeding programs except in special cases. Nevertheless there are several considerations that make a thorough exploration of the possibilities almost imperative.

Of first importance, perhaps, is the success that has attended the use of certain diseases when applied as sprays. Water suspensions of virus organisms of the alfalfa butterfly, the European pine sawfly, and the Virginia pine sawfly have given excellent control; and encouraging results have been obtained with similar sprays applied against the great basin tent caterpillar. Further developments along this line are sure to follow.

Also of great importance is the fact that new sprays and improved methods of application have made the insecticidal control of forest insects commonplace. An evaluation of the role of natural control factors is therefore becoming a real necessity, if unnecessary spraying and the unnecessary destruction of beneficial species is to be avoided. Other considerations of probably equal importance relate more particularly to forest conditions. Trees can often suffer heavy insect depredations without receiving more than a seasonal setback. Often, then, when biotic factors effect partial control, so many insects may be killed that the tree survives and no serious damage is done.

Finally, the tremendous tree-planting programs that have been, and still are being, sponsored by state and federal agencies, are producing large areas of single-tree species; and these plantations often are badly in need of protection against insect pests.

Some Recommendations

This review of past and present work in the biological control of forest insects, together with some ideas regarding the possible further use of the method, leads naturally to recommendations regarding future work. Work on many aspects is needed.

First, the importation of enemies of introduced pests should be renewed where practical, if we are to develop an adequate program in this important field. The Agricultural Research Service maintains a laboratory at Paris, France, for this purpose; and undoubtedly some work could be done through that office. Enemies of the balsam woolly aphid are needed to supplement colonies received from Canada, for liberation in New England; and it is possible they will be needed for liberation in Oregon and Virginia, where the same or very closely allied hosts are causing serious tree mortality. Investigations in Europe are also needed on several species to determine whether there are enemies of these pests which it might be desirable to establish here. In fact, it would be helpful if someone in Europe were studying the various possibilities such a program might offer.

Carefully planned programs are badly needed to evaluate the role that natural control factors play in holding most of our important forest pests in check. These are exceedingly complex problems. In most instances, to obtain a satisfactory solution it will probably be necessary to employ several investigators working as a team, under a competent leader, in much the same way that the spruce budworm problem has been attacked in New Brunswick.

Of course, some work along this line is being conducted from most of our forest insect laboratories, but in general far more intensive programs are needed. Very little, for instance, is known regarding

the role that natural control factors play in holding some of our most destructive bark beetles in check, for the simple reason that between outbreaks the pest is actually hard to find. The same might be said of the borers, which render worthless such a high proportion of our hardwood forests in the South. Almost nothing is known about these insects or the conditions that make the trees susceptible to their attack—to say nothing of their natural enemies.

Ecological research of the type needed is very expensive, and it would be impractical at this time to recommend programs of this sort for all our important forest insects. Gradually, though, the worst pests in each area should be studied in this way. Otherwise only the most obvious biotic factors will be taken into consideration when control programs are planned. It is unrealistic to guess at the potential value of our most important allies.

It is hardly necessary to recommend increased research in forest insect diseases. The need is recognized. Well-equipped laboratories and specially trained personnel are essential. No doubt a good deal of research on forest insect diseases can be done in cooperation with the Agricultural Research Service, with universities, and with experiment stations; but facilities for some work along this line should certainly be available at several of the Forest Service experiment stations.

A limited amount of experimentation should also be conducted in the use of natural control factors as direct control agents. There is little evidence that the numbers of a beneficial species can be increased substantially under natural forest conditions, but forest plantations present a different situation. They are very often isolated blocks far from natural stands, and specific biotic factors may be entirely missing.

The Canadians have obtained satisfactory control of two European pine sawflies (*Gilpinia frutetorum* [F.] and *Diprion similis* [Htg.]) under such conditions by releasing large numbers of cocoon parasites against them (*Dahlbominus fuscipennis* [Zett.] and *Monodontomerus dentires* Dlm. respectively). Possibly similar work with an egg parasite (*Closterocerus cinctipennis* Ash.) of the red headed pine sawfly would prove profitable. Benjamin (*1*) recorded extremely high parasitization by this species in certain locations. European workers are conducting some very interesting experiments along similar lines, using suitable forms of the red forest ant for forest insect control in spruce and pine forests (*4*).

Special research should also be undertaken to evaluate the role of the biotic factors that affect certain forest insects in pure and mixed plantations. Several workers, notably Voute, (*10*), have pointed out that outbreaks of insect pests occur less often in virgin forests than in those established or managed by man, and recently Hicock (*5*) went so far as to say that ". . . protection against insects and disease is best accomplished by regulation of stand composition during improvement operations so that at least 4 species with different characteristics and requirements are represented."

If this general supposition is correct, it should certainly be given consideration before large areas are planted. However, precise information is needed about individual tree species; and well-planned research is necessary to determine whether the biotic factors affecting a particular pest, such as the white pine weevil, are more effective in mixed than in pure stands.

Finally, work that is now being done in observing and cataloging the various biotic factors affecting our forest pests should certainly be continued and expanded. Rearing and cataloging may appear rather routine, but it is the basis for more intensive study; and, in itself, it often leads to the discovery of useful factors. Detailed biological and ecological studies of individual species will always be essential if we are to appraise their role accurately.

These recommendations contain little that is new, and they may seem pretty ambitious if put in one package and labelled "biological control." Actually they are only part of the more thorough ecological study of our forest pests that most foresters and forest biologists feel is badly needed.

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A Study of the Growth and Value of A High-Quality Eastern White Pine Tree[1]

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EASTERN WHITE PINE (*Pinus strobus* L.) is subject to extremely wide variation in tree quality and value. Its management is commonly regarded as a rather discouraging proposition largely because the quality and value of white pine grown at the ordinary intensity of silvicultural practices tend to be rather low. On the other hand, it is beginning to be recognized that the application of greater skill in management may make it possible to grow white pine of quality and value at least comparable to that of the old-growth trees that once formed the base of the American lumber industry.

This account represents an analysis of the growth and development of a single white pine tree, 125 years old, of high quality that grew in an even-aged stand on the Pack Demonstration Forest at Warrensburg in eastern New York. The tree had been regarded as the outstanding example of a white pine of optimum development before it became available for detailed analysis when overthrown by a windstorm on November 25, 1950. In addition to assessing the stumpage value of this tree, the analysis was extended to a consideration of the increased final value that would have resulted from high pruning.

Life History of the Tree

This tree grew near the edge of a 10-acre area which is known to have been cleared of the original forest growth stortly after the year 1800. The surface of the ground is covered with a large number of boulders, and since no evidence of a plowline can be found in soil profiles, it can be assumed that the area was pastured. It was abandoned as a pasture some time after it was naturally seeded with white pine in the fall of 1824. The resulting stand became a typical example of the pure, even-aged, old-field, white pine type of the Northeast.

The annual rings of the tree indicated a similar spurt in diameter in 1825. Diameter growth was regular but restricted until the year 1888. At that time a marked increase in growth occurred, presumably caused by a partial cutting, as other contemporary white pines growing in the same area indicated a similar spurt in diameter growth in 1888. The study tree was then 63 years old, 12 inches d.b.h., and 80 feet tall. An understory of hemlock and hardwoods had already become established and had attained a height of 5 to 10 feet.

These understory trees reveal facts not shown by the annual rings of the pine overstory. In 1918 a definite widening of the annual rings of the hemlock trees occurred possibly as a result of a partial cutting of hardwoods for fuel. However, a substantial number of hemlock and hardwood trees were left, forming a stand which is now about 60 feet tall with trees ranging from 6 to 12 inches d.b.h. This stand grew up beneath the old-field pine and did not affect the development of the crown of the study tree. At the time of windthrow this tree had attained a total height of 110 feet with a live-crown length of 65 feet above a limb-free trunk of 45 feet.

Suitability of the Tree for Investigation

The development of eastern white pine of high quality has been a major objective at the Pack Forest for many years (*2*). Close spacing during early life is considered essential for the development of tall straight boles, and except for stagnation in young stands, crowding has little influence on height growth. Tarbox and Reed (*6*), for example, found on the Harvard Forest that 20- to 30-year-old white pine plantations varying in density between 500 and 3,000 stems per acre did not significantly differ in total height. On the other hand, average branch diameter increased 2½ times as stand density decreased from 3,000 stems per acre to 500 stems. Evidently, full attention to diameter growth need not be given until a stand reaches a height of 50 or 60 feet.

There have been a number of examples on the Pack Forest of isolated trees left after logging which developed into mature trees of excellent quality. These trees have played an important part in the evolution of a system of white pine silviculture which emphasizes growing large valuable trees. The study tree had been pointed out for many years as an example of a white pine grown with this objective.

Analysis of the Tree

A ring count was made on the stump and at the top of each log and the average diameter by decades determined (Table 1). There are several facts which show that this tree was a codominant throughout its early development. For instance, the restricted diameter growth until 1888 definitely indicated early crowding. Also, other trees in the stand were larger. Measurements made on the stump of a contemporary pine only 60 feet away also showed the effect of the 1888 cutting. This tree at that time

[1]Adapted from a report submitted in partial fulfillment of the requirements for the degree of Master of Forestry in the College of Forestry, State University of New York at Syracuse University, June 1951.

had a diameter 5 inches greater than the study tree.

Prior to the partial cutting of 1888, the radial growth of the study tree was 10 rings per inch. For the next 62 years it averaged seven rings per inch. Except for slight fluctuations, this favorable rate of growth was maintained until the last decade. After 1888, the tree apparently grew crown-free. From then on, the presumption is that rainfall was the major limiting factor influencing diameter growth. In fact the slowing of diameter growth at the end of the last decade may well be attributed to the extremely dry summers of 1947, 1948, and 1949 rather than to old age.

Although the tree was overthrown by wind, it was not otherwise damaged. The logs were sawn into one-inch boards of wide widths and the lumber graded in accordance with the white pine grading rules of the Northeastern Lumber Manufacturer's Association (*4*). (See Table 2). Red rot, caused by *Fomes pini* (Thore) Lloyd, found in isolated sections within logs 2, 3, and 4, caused a signficant loss in value of the lumber. All of the No. 5 Common lumber would have graded one or more grades higher except for the rot. Also part of the No. 4 Common lumber would have graded No. 3 Common or better had there been no decay.

The lumber prices presented in Table 3 were used to translate the lumber produced into monetary terms. They compare closely with those quoted in the January 26, 1957 copy of the *Commercial Bulletin* (*1*) and reflect prevailing local wholesale prices f.o.b. mill. The stumpage value of the standing tree to the owner was determined by deducting logging and manufacturing costs, including operator's profit and overhead, from the value of the finished lumber. The costs of logging, delivery to mill, and operator's profit was estimated at $25.00 per M. bd. ft. The cost of manufacturing, including milling, yard and selling cost plus profit was calculated at $40 per M. bd. ft. making a total cost of $65. This total cost is conservative and reflects the lower costs of handling material from large high-quality trees. The average costs of handling smaller, rougher logs would be 10 to 20 percent higher.

Using these assumptions the stumpage value of the tree to the owner was calculated to be $133.95. It is emphasized again that this tree was of unusually high quality for rarely does an eastern white pine grow to such a value in 125 years. The large quantity of select lumber it contained can only be partly accounted for by early crowding. It is presumed, therefore, that most of the small dead branches were brushed off by the felling of nearby trees in the 1888 partial cutting.

TABLE 1.—GROWTH OF THE TREE BY DECADES

Age	Year	Dia. growth for ten year periods	D.i.b. at stump ht.	D.b.h.[1]	Total ht.	Est. merch. ht.	Volume[2]
		Inches	*Inches*	*Inches*	*Feet*	*Feet*	*Bd. ft.*
0	1825						
5	1830						
15	1840	1.75	1.75	2.0	12		
25	1850	1.87	3.62	4.0	31		
35	1860	2.00	5.62	5.5	46		
45	1870	2.50	8.12	8.0	60	32	50
55	1880	2.37	10.50	10.5	74	48	90
65	1890	2.25	12.75	13.0	84	56	170
75	1900	3.62	16.37	16.0	92	64	305
85	1910	2.62	19.00	19.0	97	72	500
95	1920	3.25	22.25	22.0	101	80	730
105	1930	3.27	25.62	25.0	105	80	1,000
115	1940	2.87	28.50	28.0	108	88	1,300
125	1950	2.62	31.12	30.0	110	88	1,513[3]

[1]D.b.h. derived from measurements made on the stump.
[2]Bd. ft. vol. determined by int. ¼in. log rule for form class 80.
[3]Actual bd. ft. vol., mill scale.

The Case for Pruning

While this tree attained extraordinarily high quality without silvicultural treatment, let us consider what might have been its value had intensive management been practiced. It could not reasonably be expected that the volume growth could have been substantially increased through special treatment. But something could have been done about the overgrown black knots that accounted for a large amount of low value lumber. The question arises then, what might have been the change in value if the tree had been artificially pruned?

White pine does not prune well naturally. Rarely is natural prun-

TABLE 2.—ACTUAL BOARD FOOT VOLUME OF THE TREE BY MILL SCALE

Log No.	B sel. & +	C & D sel.	1 & 2C.	3C.	4C.	5C.	Total
1	168	127	64	12	28		399
2	22	124	46	98	56		346
3	16	16		62	105	102	301
4				0	202	21	230
5				30	46		141
6				7	97		71
7				15	49		25
Total	206	267	110	224	583	123	1,513

TABLE 3—DETERMINATION OF THE STUMPAGE VALUE OF THE LUMBER TO THE OWNER PER M. BD. FT.

	B sel. & +	C & D sel.	1 & 2C.	3C	4C.	5C.
Wholesale lumber price	$300	$250	$150	$125	$90	$55
Cost of manufacturing	65	65	65	65	65	65
Stumpage value	235	185	85	60	25	—10

Table 4.—Predicted Board Foot Volume of the Three-Log Pruned Tree by Mill Scale

Log No.	B sel. & +	C & D sel.	1 & 2C.	3C.	4C.	5C.	Total
1	364		21	7	7		399
2	292		18	18	18		346
3	253			24	24		301
4				0	202	21	230
5				30	46		141
6				7	97		71
7				15	49		25
Total	909	0	39	101	443	21	1,513

Table 5.—Predicted Stumpage Value Added to the First Three Logs and to the Tree by Pruning

Degree of pruning	First log	Second log	Third log	Tree
Unpruned	$69.84	$39.30	$12.04	$133.95
One-log pruned[1]	86.13	39.30	12.04	150.24
Two-log pruned[1]	86.13	73.74	12.04	184.67
Three-log pruned[2]	87.92	71.68	61.50	233.86

[1]Pruned at age 45.
[2]First log pruned at age 35. Second and third logs pruned at age 50.

ing of the butt log completed within the lifetime of a tree. Paul (5) found that dead branches persisted for an average of 27 years on the first 20 feet of the stem. The maximum length of time that branches persisted was 73 years in an 86-year-old stand.

Artificial pruning in general practice is confined to the first 17-foot log and most pruning tools and techniques are designed for pruning to this height only. However, there is no silvicultural limitation restricting pruning to 17 feet. Pruning to greater heights can subtantially increase the value of white pine trees that are allowed to grow to maturity. High pruning employed on the Pack Forest since 1949 has indicated that this practice is desirable and on the best sites here, pruning up to three logs is considered feasible. On average sites, however, two-log pruning is advocated, while on poor sites pruning is usually limited to one or one and one-half logs. It should not be assumed from this experience that pruning should be delayed until middle-age—40 to 60 years—but on the other hand it should be more generally realized that high pruning of tall, straight, vigorous trees growing in middle-aged stands on good sites is also to be regarded as financially and silviculturally feasible.

It is well known that pruning increases the lumber grade. Only recently, however, has it been learned on the Pack Forest that early elimination of dead branches and weeviled leaders followed by overgrowth prevents the entry of red rot which causes substantial loss in value to white pine lumber. The study tree contained red rot infections in logs 2, 3, and 4. The infection in the second log resulted in only minor loss in value. But the infection in the third log caused appreciable degrade of lumber. If this tree had been pruned at age 50, it would not have contained any red rot. In no case on the Pack Forest has red rot been observed to have entered the pruned portion of the stem following artificial pruning.

Table 4 shows the predicted lumber grade recovery that might have been realized by pruning the study tree to a height of three logs. The lumber grade recovery from the "pruned" logs was calculated on the basis of a realistic plan of sawing which would recover the maximum amount of wide B Select and better boards around the outside of the knotty core. By comparing Table 4 with Table 2 the difference one might expect in the lumber grade of the first three logs as a result of high pruning can be determined.

The stumpage value of each of the first three logs was then calculated, assuming the study tree had been pruned to heights of 15, 30, or 45 feet (Table 5). Artificial pruning at age 45 could have increased the value of the butt log by $16.29. The increase was no greater because most of the branches had actually dropped off this section of the tree at an early date. In the second log, the value added by pruning could have been $34.44. This increase in value is attributed directly to the fact that pruning could have allowed a substantial amount of select lumber to be grown in place of the relatively large amount of common lumber actually contained in the second log. In the third log, which would have received little natural pruning, the increase in value could have been $49.46. Part of this large increase in value of the third log would be attributed indirectly to pruning, through the timely removal of the dead branches which, no doubt, would have prevented the entry of red rot into the third log. Most of the increase in value of the third log, however, would have been the direct result of pruning viz., the production of a large percentage of select lumber in place of the very small proportion actually contained in this log.

High pruning is performed on the Pack Forest with the aid of a 28-foot aluminum extension ladder or with climbing spurs. By standing on the top rung of the ladder and using a pruning saw attached to a 6-foot pole, one is able to remove branches to a maximum of 35 feet above the ground. Three-log pruning has been accomplished by using standard telephone pole climbing spurs. A man so equipped can prune 40 trees per day to an average height of two logs. Some trees have been pruned by this method to a maximum height of 50 feet. Although the spurs cause slight injury to the wood and an infiltration of pitch, these minor defects are contained within the knotty core, and should cause no additional degrade of lumber. However, it is not believed advisable to

reclimb a pruned tree with climbing irons.

Summary

An intensive study of a select eastern white pine tree was conducted on the Pack Forest in eastern New York. This 125-year-old tree was 30 inches d.b.h., 110 feet in height and contained a volume of 1,513 board feet. The stumpage value of the tree was $133.95 after costs of manufacturing had been deducted from the value of the finished lumber. This was its value to the owner as it stood in the woods. Three-log pruning at the proper time would have increased the value to $233.86. High pruning not only provides increased lumber values, but also greatly reduces the possibility of loss in value caused by red rot. This tree is considered to be an example of the size and quality that may be expected from growing select trees on good sites under management.

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Notes

The Harvard Forest Prism Holder for Point-Sampling

A simple prismatic instrument for use in point-sampling, or plotless cruising, was designed at the Harvard Forest in 1955. This prism holder has given satisfactory results for cruising over 15,000 acres of forest land in New Hampshire and Massachusetts. One man worked alone to do most of this cruising during parts of two summers.

The principles governing the use of prisms in point-sampling have been ably discussed by David Bruce.[1] The instrument described here is merely an adaptation of these principles to give the following advantages:

1. The prism is easily set up in the line of sight.

2. The prism is compactly mounted on the cover of a 5 inch by 9 inch clip board that fits the hip pocket, leaving both hands free during travel between plots. It could be mounted on any clip board or in a special case.

3. While in use the clip board and prism are held in one hand, leaving the other hand free to record data.

[1]Bruce, David. A new look at trees. Jour. Forestry 53:163-167. 1955.

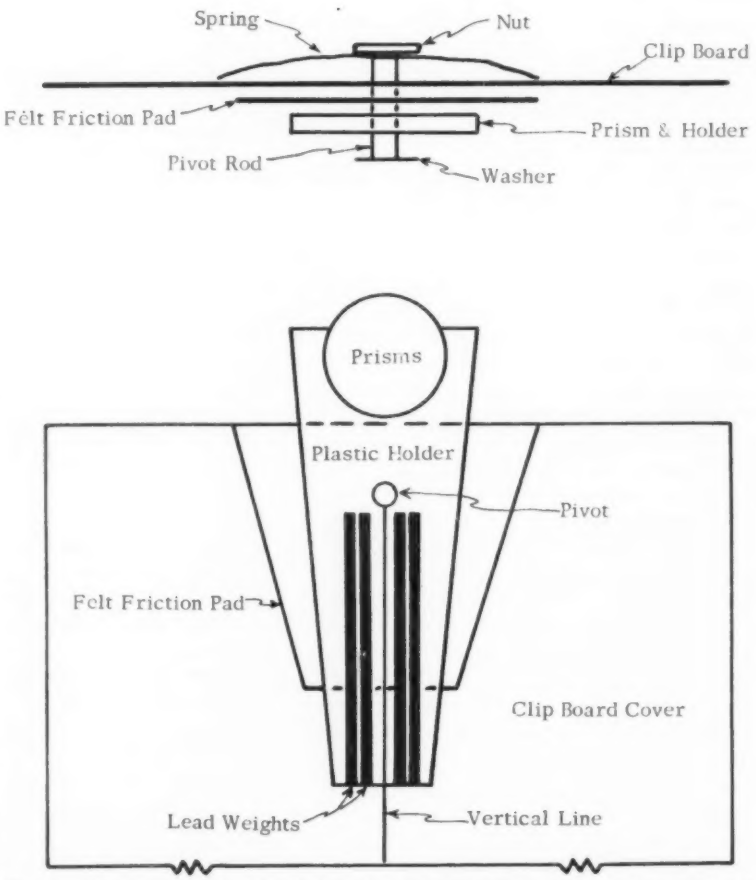

FIG. 1.—Above, exploded view to top edge of clip board cover showing detail of pivot rod arrangement; below, front view of prism holder mounted on inside of clip board cover and in position for use on slopes of 10 percent or less. Holder is swung to horizontal position for carrying.

4. On slopes of less than 10 percent the prism is set for use in a second or less. Correction for slopes over 10 percent is easily made in a few seconds.

5. On completion of use the prism is made ready for carrying by a flip of the hand, and is protected along with the tally sheets inside the closed clip board.

A pair of flat wedge prisms of about four diopter strength were used. These were ground round to about 15/16-inch in diameter. This approximate size was the best of several tried. The prisms were adjusted for a basal area factor of 10, and in such a way that they gave no vertical displacement of the image, and then were cemented together with canada balsam. (Prisms of appropriate strength can be used in the manner described by Bruce to get any basal area factor desired.)

A holder for the pair of prisms was made from a piece of clear Plexiglas about 3/16-inch thick. This material can be shaped with ordinary woodworking tools. The holder is about 3½ inches long and has the form shown in the diagram. This design can be altered to suit individual preferences. The prisms were cemented into the yoke of the holder, and lead dress weights were inserted in holes at the opposite end to act as counterweights below the pivot point.

A hole the size of the pivot was drilled in the center near the top edge of the clip board cover so that when the prism holder is mounted the prism will be seen over the end of the clip board. The pivot was ½-inch long and made of brass rod 3/16-inch in diameter with a washer soldered on the inside end, and a small nut threaded on the outside end. A thin steel strip was bent and inserted under this nut on the outer side of the clip board to give spring tension and press the prism holder against the felt friction pad glued on the inside of the cover.

When in use the base of the clip board is held against the chest and at such a slope that the open cover will be vertical and the prism at eye height. The prism holder is turned to the vertical position so that lines scribed on the back of the holder and on the clip board cover coincide. This position will serve for slopes of 10 percent or less.

For greater slopes the operator turns the side of the clip board cover toward himself, and sights along the top edge of the cover to a point at eye level up or down slope. Then he presses on the pivot screw to release the pressure on the friction pad so that the prism holder swings free like a pendulum. When the pendulum action has stopped he releases the pivot to press the holder back against the friction pad and freeze it in position. Then the clip board is returned to the vertical position, face toward the operator, and is used in the normal manner without moving the prism holder from its slanted position. Through its pendulum action the prism holder rotates by the degree of slope and at the same time turns the prism by the same amount around the line of sight. This obviates mounting the prism on a shaft and rotating this shaft by gears and a separate pendulum.

The number of times the slope is corrected on each plot will depend on the degree of slope and the accuracy desired. Often one or two settings per plot are enough, or at the other extreme a setting may be needed for each tree counted. Of course a protractor can be added to measure slope if it is desired.

This prism holder can be made by almost anyone. Round prisms have been purchased for $2.50 to $3.00 a pair and the Plexiglas is about $3.00 a square foot. Pivot material can be picked up in almost any hardware store for a few cents, and canada balsam is carried by drugstores. A piece of felt hat was used for a friction pad, and enough dress weights for one holder cost about five cents. A completed holder thus costs only a little over $3.00 for materials, plus some time and ingenuity.

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Why Do Bears Girdle Balsam Fir in Maine?

During the summer of 1956, forest survey crews and fieldmen of the Spruce-Budworm Survey, operating in the northern counties of Maine, noted a type of forest tree mortality previously unrecorded in surveys of the spruce-fir region of the Northeast. This phenomenon is the girdling of balsam fir, red spruce, and northern white-cedar by black bears.

Bear girdling that causes injury or death of pole and sawtimber trees was found to be common throughout the northern portions of Aroostook, Piscataquis, and Somerset counties. Such injuries were not observed in the coastal region.

As yet there is no detailed information on the relative importance of this kind of damage, nor has the southern limit of the affected area been determined. Total volume loss cannot compare with that resulting from insects and disease, but locally this bear damage reaches such severe proportions that fir may be eliminated from the stand.

Where pure fir stands are involved, the damage is striking. Pockets of dead firs sometimes exceed an acre in size and may reflect bear-girdling injuries sustained over one or more seasons. A pocket may be an irregular patch in deep woods or a band along an old logging trail where a feeding bear moved from tree to tree.

Bear girdling is characteristic and may be easily recognized even on trees killed several years ago. The bark is pulled up, out, and away from the base of the tree either by biting or clawing. Usually some remains attached and dan-

gling in long strips. The marks left where the bear hooked its claws in the bark can be detected upon close examination of the inside surface.

There is no evidence that any bark or wood is actually eaten: the bears probably only lick the sap and gum from the inner bark. Some woodsmen and game protectors who were interviewed said they have seen bears doing this, especially in the spring.

A bear's taste seems to run especially to balsam fir. Spruces are attacked much less. Only an occasional cedar is injured—rarely girdled completely. However, on all species even incomplete girdling still is very damaging to individual trees because it permits introduction of stain and decay organisms. There have been no observations of bears injuring the other softwoods or the hardwoods species common to the area. Large poles and small sawtimber trees are damaged more frequently than other size classes.

Further observations will be made during the 1957 field season in an attempt to define the borders of the area where girdling can be expected and to lead towards a quantitative appraisal of volume loss.

Of course, a few explanations would be interesting: Why do bears prefer balsam fir? Does it satisfy a particular dietary need? Why do they choose certain stands or locations? Is the habit newly acquired? Is it spreading?

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Club Pruning at Low Temperature

Pruning of forest trees usually has the objective of enhancing the quality of lumber by eliminating knots in wood laid down after the pruning. Foresters have generally emphasized that clean, smooth cuts should be made flush with the bark and that chopping or breaking off branches should be avoided because of the danger of pitch pockets, decay, and other defects. Indeed, lumber sawn from trees carelessly pruned by the axe, with stubs left projecting, has shown inferior overgrowth to those closely and carefully pruned by saw. So, in pruning selected crop trees for clear lumber, foresters are careful to see that knots are close, not only flush with the bark, but cutting through the bark callus ring; that they be sawn — not clipped, bumped, or shattered, and split. This is quite as it should be. This work requires skill, care, and good tools.

There are cases where it is desirable to remove branches for other purposes where the expense of crop tree pruning is not justified. These purposes include:

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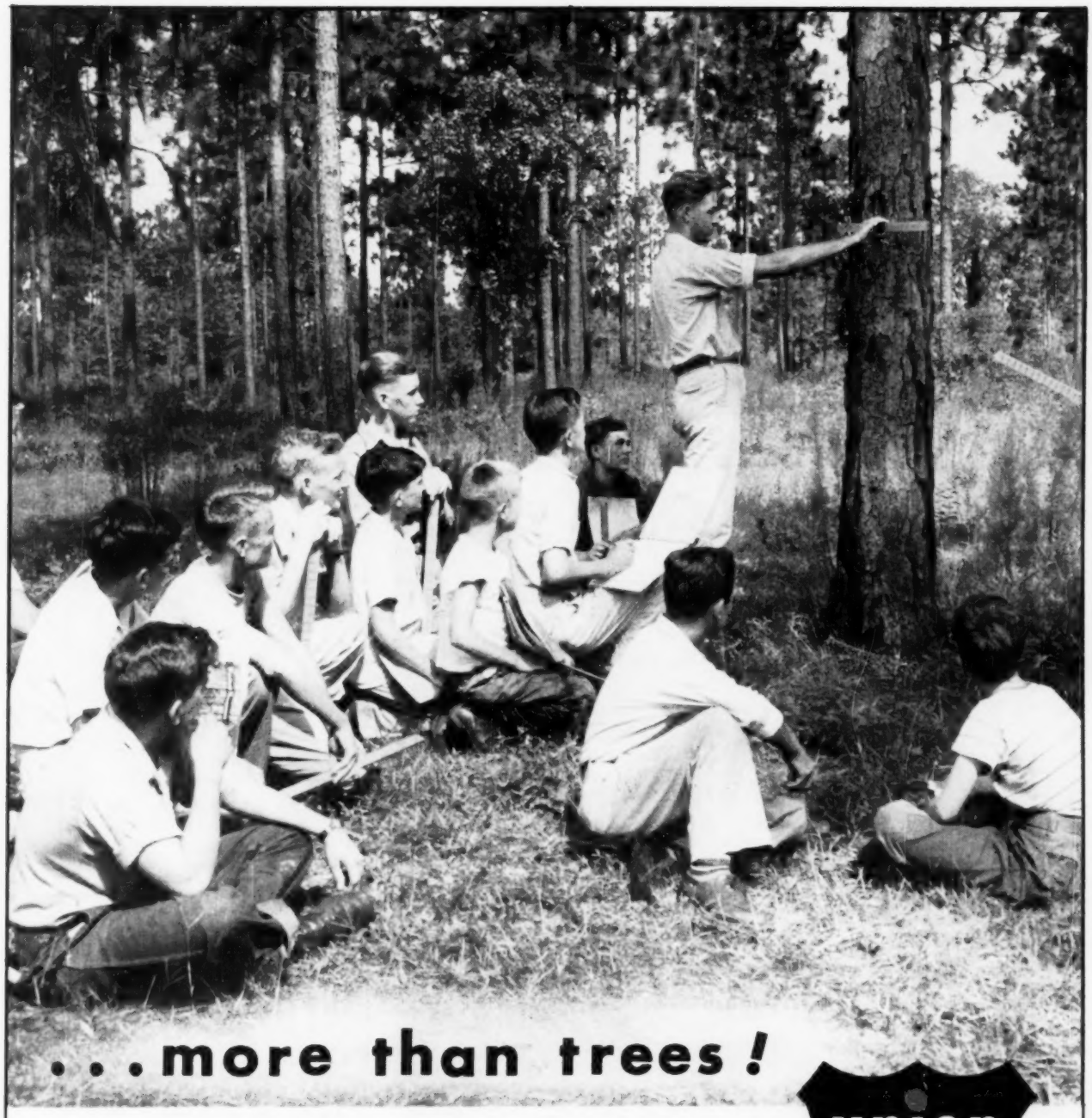

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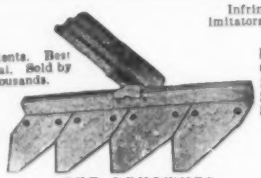
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2. Swamping out property lines.

3. Pruning trees on sample plots to facilitate measurements.

4. Pruning plantations along roadsides to reduce fire hazard.

5. Pruning dense young stands in order to facilitate marking, thinning, and inspection.

6. Marking boundaries for stand improvement work, timber sales, etc.

7. Cutting out telephone line rights-of-way.

In these and many other cases removal or reduction in length of branches on one or more sides of a tree, usually only to head height, is satisfactory by any method that does not lead to infection by wood rots, cankers, and other diseases. Commonly a light axe, machetes, clippers, etc. may be used.

Kachin (*1*) reported the use of a club for pruning, the so-called Hebo Club. This consisted of an old mattock handle with a metal shoe weighing 3½ lbs. Shorter clubs used from a ladder weighed 2¼ lbs. Douglas-fir branches were broken off within the branch collar, leaving a cavity 1 inch inside the tree stem. Branches as large as 2 inches could be broken off. Curtis (*2*) criticized this as unsuitable for pruning with the aim of producing knot-free lumber, because of the slow and abnormal healing, leaving a pitch pocket, etc. Zach (*3*) pointed out that when used to remove dead branches from Douglas-fir the club method was entirely satisfactory, due to the rapid diameter growth.

It was not the intention of following this practice to produce clear lumber, but rather David B. Cook's observation that larch twigs could easily be cracked off in very cold weather, that led to experiments with other trees. It is a familiar fact that twigs are more brittle when cold. Balsam fir twigs snap like matches at temperatures below zero. Large trees felled in heavy frost frequently break. Loggers know that it is easier to trim trees in very cold weather. Seedlings and saplings suffer more from logging injury under these conditions. A study conducted a few years ago indicated great differences among species in susceptibility to logging damage. Spruce and hemlock were resistant, the pines brittle and sensitive when very cold. There is good evidence that the moisture content of the wood has much to do with brittleness. High moisture content is associated with snapping and cracking of trees in extremely cold weather, low moisture with toughness and elasticity. Larch twigs with much sapwood, devoid of needles to transpire water, are high in moisture content and hence brittle, while other species, with a greater proportion of heartwood in twigs and lower moisture content are more resilient. However, the characteristics of the wood itself are also important; balsam fir is weak and brittle compared to spruce and hemlock. Dead branches, if sound, with lower moisture content, can be expected to be less brittle than live ones, but this

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varies considerably with the species.

Bumping off branches with a club was tried January 14-20, 1957 at temperatures ranging from 5° to —28°F. Work was done on snowshoes, using an old sledge handle weighing 1 lb., a rake handle, and other similiar clubs. It was found possible to remove twigs and branches completely to 10 feet on European larch with an average of three strokes of one hand. Branches 1 to 1½ inches in diameter could be severed close to the trunk with a smart blow. Norway spruce was somewhat less easily cleaned, but live branches could be broken at any desired length. White pine and balsam fir were also easy to clean if the branches were green and not over ½ to 1 inch in diameter. Red pine offered more resistance. Green Scotch pine cleaned easily but dead branches were almost impossible to break. With the exception of larch, ease of club pruning appeared to be analogous to susceptibility to snowbreak in the species.

A week after the low temperature trial branches were clubbed in the same stand at +5°F. The temperature had dropped below zero 24 hours previously after four days at +60°F. Results at this time were poor compared to the earlier test. Larch "pruned" most easily, followed by white pine. Spruce twigs were resistant, and red pine could hardly be broken at all. Just what the critical temperature is for easiest pruning remains to be determined.

Damage to the trees compared to less violent methods of pruning is difficult to assess without following the condition of the trees for several years. In larch, it would appear that the branches break off so cleanly and close to the bole that little if any advantage could be obtained by more leisurely and gentle methods. Larger branches frequently break off inside the tree, leaving a cavity ½ to 1 inch deep. This will doubtless be slower to heal than a flush cut over which the callus can grow.

Probably the greatest advantage

of clubbing off branches at very low temperatures is that it is economically possible to prune trees like larch and spruce that have so many fine twigs that saw pruning is prohibitively expensive. It should be emphasized again that the writer does not recommend knocking off branches as a substitute for careful pruning with saw in eastern forests. It admittedly has limited application, but as a rapid, cheap means of cleaning trails, lines, and possibly shaping Christmas trees it is certainly easier, and causes less damage than an axe or other sharp tool.

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HENRY I. BALDWIN
New Hampshire Forestry & Recreation Commission

Reviews

Hough's Encyclopedia of American Woods

By E. S. Harrar. Vol. I: In two sections. 204 pp., 75 wood samples. Robert Speller & Sons, New York. 1957. $25.

Over 35 years ago as an undergraduate this reviewer thought that Hough's wood sections were marvelous. He still is of that opinion after examining the latest offspring of the *Encyclopedia of American Woods*. Romeyn Beck Hough had an idea about making wood sections, but there was no equipment for doing the job. So he designed a machine and supervised its construction. "He began cutting sections in . . . 1883, and published his first volume in 1888. The 14th and final volume of the set was released in 1928 four years after his death." Now we have a new edition, volume I of which has recently been issued. All together 15 volumes are planned, a new one to appear each six months. For this ambitious undertaking, Dean E. S. Harrar of the Duke School of Forestry is acting as editor-in-chief.

Volume I consists of two parts. The first is text, written by Dr. Harrar, containing information on 25 species: seven pines, two spruces, two hemlocks, three true firs, and in addition, Douglas-fir, western larch, baldcypress, redwood, western redcedar, incense cedar, Arizona cypress, Alaska-cedar, Atlantic white-cedar, eastern redcedar, and California torreya. It is not clear on what basis the 25 species were selected. Certainly commercial importance did not dictate the inclusion of *Torreya californica*, the California-nutmeg. On the other hand it is good to see the inclusion of true firs from the West, the grow-

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ing importance of which is now increasingly recognized in the timber trade.

For each species there is an interesting introduction spiced in some instances with odd bits of information. For example, with respect to western larch: "In 1920 a plant was operated in Eureka, Montana for the extraction of the arabo-galactan complex from old stump wood. This extractive was used to produce mucic acid, an ingredient of baking powders and self-rising flours. While this product was entirely suitable for its intended use, the plant was not a financial success."

Following the introduction there is a section dealing with the tree—growth habit, leaves, fruit, bark, ornamental value, and geographical distribution—and then a section on the wood—the gross diagnostic features, microscopy, physical properties, and utilization. In the last section each species write-up is accompanied by tables giving weight in pounds per cubic foot, normal shrinkage values, strength properties, and nail and screw holding properties. Then follows a glossary and a list of selected references. The textural presentation is semi-technical and easy to understand.

The second part of Volume I consists of exquisite mounts of wood sections in a ring binder for the same 25 species covered in the text. For each species there is a transverse, radial, and tangential section, mounted so as to be seen from each side almost like a transparency. The durability and lasting beauty of these wood sections is impressive. Some of the wood sections included were actually cut by Mr. Hough himself, over 35 years ago.

The book is relatively expensive so that many foresters who would enjoy owning it may be reluctant to undertake its purchase. However, it should be of much use to forestry schools and to many libraries.

F. H. EYRE

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Light, Vegetation and Chlorophyll

By J. Terrien, G. Truffaut and J. Carles. 228 pp. Illus. Philosophical Library, Inc., New York. 1957. $6.

Rapid advances during the past decade in our understanding of the capture and use of solar energy by plants have created an important demand for review articles and comprehensive accounts of the fundamental aspects of this field. The authors of this small book have presented a brief survey of our knowledge about light as an environmental factor affecting the growth of plants, with the main emphasis on the role of light in photosynthesis. They have done this at a level appropriate for the non-specialized worker and the student of plant physiology or agricultural sciences.

The book is divided into two parts, corresponding to the translation from the original French of two related works: Part I is a translation of *Lumiere et Vegeta-*

tion, by Jean Terrien and George Truffaut, and Part II is a translation of *L'Energie Chlorophyllienne* by Jules Carles. The dates of the original publications are not given, but may be surmised to be about 1955 from the status of the knowledge presented.

Part I, with 11 chapters, deals with the nature of light as a form of energy; the variations in solar radiation reaching the earth with season, latitude, and atmospheric conditions; the photometry of the leaf, including the measurement of absorption, reflection, and transmission factors; the effects of light from the various portions of the spectrum on plant behavior; the general characteristics of photosynthesis, including a discussion of factors influencing its rate; the photochemistry of photosynthesis with analogies to the photochemical processes occurring in photography; and, finally, the light requirements for the processes of photoperiodism and phototropism.

Part II, with five chapters, deals with the chemistry of chlorophyll, including its general properties, its location in the plant, its synthesis and disappearance; the general nature of photosynthesis, including its measurement and the factors influencing it; the role of chlorophyll in the world, including its importance as a source of energy, and its use as a constituent of numerous commercial products.

The authors have succeeded well in presenting to the general reader a useful survey of principles in a vast field of knowledge. In so doing, they display that rare gift frequently possessed by the French for avoiding prolixity in their scientific writing.

Many of the principles discussed will remain valid despite the rapid progress of research. An exception must be made regarding the discussion of the mechanism of photosynthesis, which has been further clarified by more recent investigations. The present account should particularly interest teachers and research workers in agriculture and forestry. Hugh E. Wilcox

Ecological Effects of Forest Fires in the Interior of Alaska

By H. J. Lutz. 121 pp. Illus. Tech. Bull. No. 1133, U. S. Dept. Agric. March 1956.

Of the 572,500 square miles of land surface in Alaska, the author designates approximately 187,500 square miles (120 million acres) as "interior forest." Four summers were spent in study of the ecological and silvicultural problems of this great region. Data on 103 sample plots (1/10 acre), 11 transects, and 860 milacre quadrats were recorded and analyzed. The study was sponsored jointly by the Forest Service and the Bureau of Land Management.

The interior forests of Alaska are analogous to the "taiga" of northern Europe in species composition and in general aspect. White spruce is the usual dominant on well drained sites but the forest has burned so extensively that little

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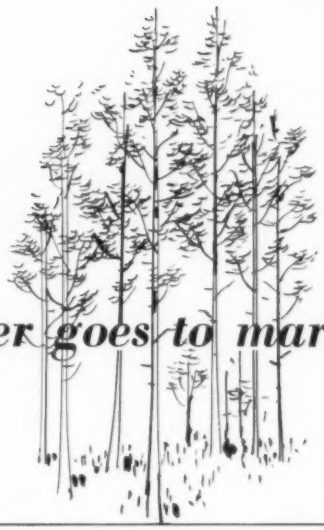

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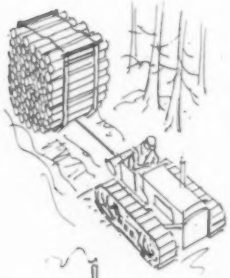

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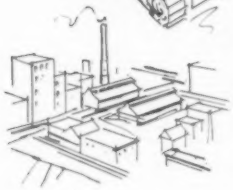

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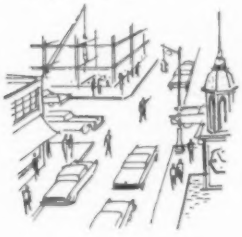

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of the country remains in climax stands. Excellent historical evidence is compiled to show that Indians set many fires prior to the Gold Rush. Thereafter occurred a period of greatly accelerated burning caused by the carelessness of the miners and other settlers. Even today man-caused fires are common, some set deliberately. "An average of at least a million acres of forest land has burned annually for the last half century." (p. 90). These fires have destroyed a substantial part of the mature spruce of interior Alaska, giving rise to enormous areas of aspen, birch, and scrub willow. The greatest silviculture problem of the region is fire control.

Burning has materially altered the habitat for big game animals and fur bearers which also are important local resources. The general effect on fur bearers has been to lower populations somewhat. Fires are disastrous for caribou, whose winter foods are principally lichens of the genera Cladonia and Cetraria that grow beneath the open spruce stands. Effects on moose are not so clear. In many areas it is obvious that moose have increased with the growth of birch and willow following burning, these plants being primary winter foods for moose. But the author goes to some pains to demonstrate that moose have not increased equally on all burned areas. He makes his point that irresponsible burning is not necessarily good moose management. However, he acknowledges that controlled burning may be a useful technique for augmenting the supply of moose forage on some winter ranges.

The recreational value of the interior forests and the relationship to the tourist industry are discussed, with emphasis again on the need for fire control.

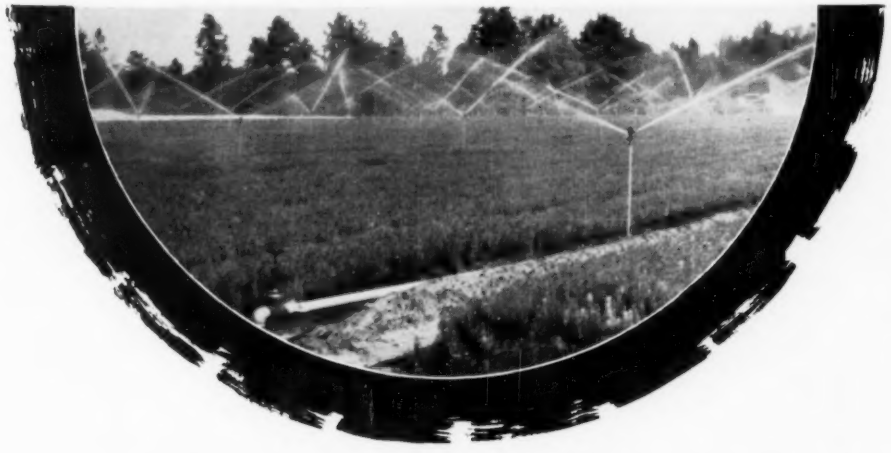
Harold Lutz is a competent historian as well as a natural scientist. I am impressed in this paper, as I have been in other reports of his, with the thorough coverage of the literature and the reconstruction of historical background to help understand contemporary problems in ecology.

A. Starker Leopold
University of California

Results of the First Thirty Years of Experimentation in Silviculture in the Harvard Forest, 1908-1938. Part II. Natural Reproduction Methods in White Pine—Hemlock Stands on Light, Sandy Soils.

By R. J. Lutz and A. C. Cline. 70 pp. Illus. Harvard Forest Bull. 27., Harvard Forest, Petersham, Mass. 1956. 50 cents.

This second part of the Harvard Forest "Thirty-year report" deals with a cutting experiment established in 1924 in a mature but previously unmanaged white pine-hemlock stand growing on glacial outwash sands. The experiment was destroyed by the hurricane of



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1938, and the report was originally prepared in 1941, but has been revised subsequently in the light of a survey of regeneration in 1949 using stocked-milacre quadrats.

Basically, it presents detailed case histories of four alternative cutting systems (2-cut shelterwood, 3-cut shelterwood, group selection, and alternate strip clearcutting) applied to a total of 11.2 acres. In the final analysis, all the cutting methods failed to reproduce the white pine and hemlock, apparently because of the inhibiting effect of the raw humus layer on seedling establishment. The chief conclusion reached, but one not supported by data presented is that prior thinnings would have prevented this undesirable soil condition.

Russell Lutz and A. C. Cline, as in the first part published in 1947, have demonstrated the merits of the case approach to silviculture and of the information to be gleaned from the accumulation of all the data available on a small tract. The photographs detailing the history of the stand are particularly instructive.

At the same time, the scope and extent of the tests are definitely limited. The reproduction counts in particular are based on very small samples, ranging upwards from as little as 10 milacre quadrats.

The bulletin is of interest in recording the history of one of the earlier cutting experiments aimed at reproducing eastern white pine. It would have been of much greater interest if the results had been compared with those obtained from similar trials in other experimental forests in the region.

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Tourists, mountain climbers, and sportsmen planning to visit Washington's Olympic National Park will want to get a copy of the new University of Washington Press publication, *Roads and Trails of Olympic National Park* by Frederick Leissler. Sixteen scenic highways and over 600 miles of trails are described, mapped, and photographed. The handbook is indexed for quick reference to campgrounds, shelters, resorts, roads, trails, mountain peaks and ranges, and fishing areas. Copies are available from University of Washington Press, at $1.75 each.

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General

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Forest Plantation Management. By John Aughanbaugh and F. W. Dean. 15 pp. Illus. Ohio Agric. Expt. Sta., Ohio State Univ., Columbus 10, Ohio. 1957. Bul. No. 362.

The Quick Cruise Circular Slide Rule. By A. S. Harris. 3 pp. Illus. Alaska Forest Research Center, Juneau. 1957. Tech. Note No. 37.

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Forest Products

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"FOREST LAND USE IN TRANSITION"

The theme as stated in this headline, chosen by the Society of American Foresters as a base for discussion at its 1957 annual meeting, is a good one and a broad one. It has application to the lands of the Puget Sound Pulp & Timber Co., as well as to many other lands.

Our company has for many years been working steadily on the transition of its lands from long over-mature, unmanaged virgin stands of Western Hemlock and associated species to vigorous young forests managed for perpetual, renewable wood supply.

These have been, still are, and probably for a long time to come will be, problems for our forestry staff in this transition. The first harvest in the old timber, still far from complete, demands increasing ingenuity to meet the challenge of rough terrain and to effect higher and higher wood utilization.

As we have gathered "know-how", improved our road system, intensified our fire protection, implemented our mechanization, and co-ordinated mill practice with woods practice, our "clean-up" in the virgin woods has progressed steadily.

Simultaneously, fuel left on the ground after cutting has all but vanished, thus steadily reducing the fire risk and improving the survival chances of the new growth.

All in all, our cutting has been kept on a flexible basis, to meet seasonal rigors, to counter the threats of loss by insects, disease, wind and other causes. This has been done without losing sight of basic goals—transition of the forest lands from old decadent, unmanaged stands to young, dynamic, perpetually producing forests.

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D8 with No. 8S Bulldozer spreads material which has been dumped for fill by D8-No. 80 Scraper unit, approaching in the background with another load.

NEW ACCESS ROAD OPENS WAY FOR FIRST LARGE SALE OF LODGEPOLE IN DEERLODGE NATIONAL FOREST

On January 15, last year, Naranche & Konda Construction Co. started building 7.4 miles of timber access road for the U. S. Forest Service in the Philipsburg Ranger District, Deerlodge National Forest, Montana. This Butte contractor had been awarded the job with a bid of $110,000. The job involved clearing timber, grading, graveling and drainage for a 14-foot-wide road to EE14 specifications. Earthmoving yardage totaled about 90,000. The job, completed in midsummer, cleared the way to reach large stands of lodgepole timber in the Green Canyon area. The first sale, held in May last year, was for 20,000,000 bd. ft.

Mainstays of production for Naranche & Konda on this job were two CAT* D8 Tractors and a No. 12 Motor Grader. The new D8 was equipped with a No. 8S Bulldozer, while its older brother was matched with a No. 80 Scraper. Materials handled were dirt and rock, with the older unit hauling and the new one doing such chores as push loading, installing a steel culvert pipe and spreading the material dumped on the fill. The units worked 8 hours a day, 6 days a week, with a minimum of down time. Operator Edward A. Nelson made this comment on the new D8's performance: "The torque converter is good for pushing. It gives steady power. It's good for 'dozing, too."

After digging out the ditch, this D8-No. 8S Bulldozer unit eases material up to the culvert. Hydraulic steering clutches provide positive control for precise maneuvering.

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WANTED—
THE HARD WORK

Annual Meeting

Society of American Foresters

Syracuse, N. Y. November 10-13, 1957

***Theme*: "*Forest Land Use in Transition*"**

Schedule of Events

Members, their ladies, and guests who plan to attend the Society's 57th annual meeting are urged to arrive in Syracuse on Sunday, November 10, in order to visit the College of Forestry where there will be "open house" from 2 to 5 p.m.

The opening general session will start at 9:30 a.m., Monday morning in the ballroom of the Syracuse Hotel.

The following program for the various activities is up to date as of the time of going to press.

Open House at the College of Forestry

From 2 to 5 p.m. on the afternoon of Sunday, November 10, there will be an informal reception and a series of guided trips through the buildings of the State University College of Forestry at Syracuse University, including the new Baker Forest Products Laboratory.

Special bus transportation will be provided from Hotel Syracuse.

Refreshments will be provided in the student lounge in Marshall Hall of the College.

All Society members and their guests are cordially invited to this reception.

S. O. Heiberg,
Chairman, Committee on Arrangements

Association of Consulting Foresters

Sunday evening, November 10

J. Atwood Whitman, President
Seymour I. Somberg, Executive Secretary
James D. Pond, Program Chairman

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Forestry Suppliers, Inc. is acutely aware of this challenge—aware of its responsibility to the profession of forestry. It is constantly reaching out all over the world for new and improved equipment — tools of quality and guaranteed performance that will contribute materially to the foresters' task of keeping the nation's timber economy in step with the times. In short, forestry and the house of Forestry Suppliers, Inc. will continue to grow—together.

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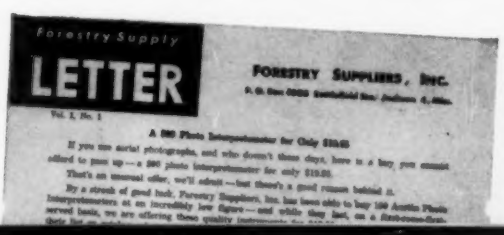
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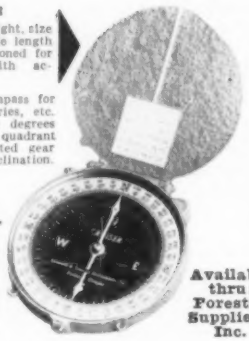

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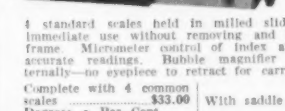

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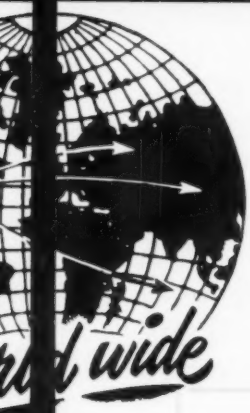

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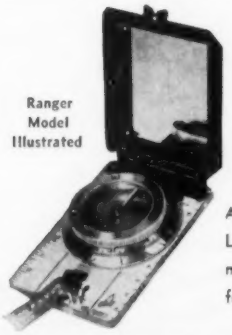

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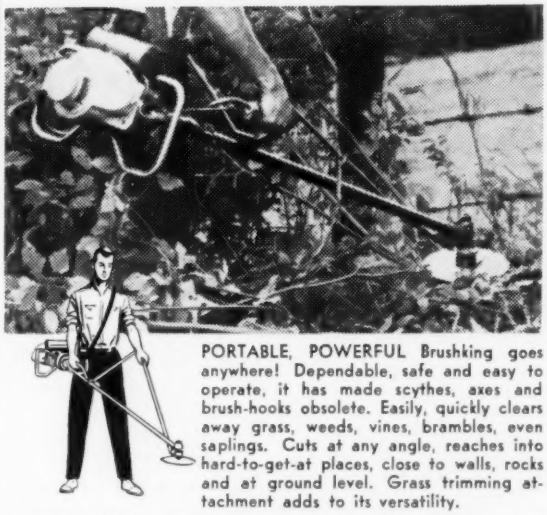

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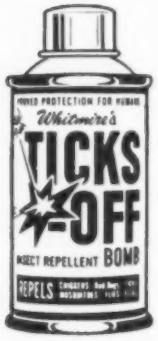

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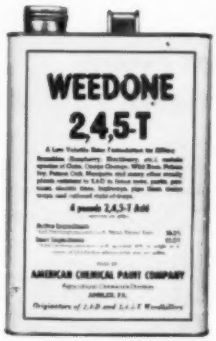

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Open Session

Panel discussion: "How the Consulting Forester Operates."

Moderator, James Craig, Forestry Suppliers, Jackson, Miss.

Participants, George C. Kiefer, Jr., Salisbury, Conn.

Verne D. Bronson, Eugene, Ore.

Edward Stuart, Jr., Hampton, Va.

Thomas F. Schweigert, Petoskey, Mich.

"Place of the Consultant in Integrated Logging." C. S. Herr, Brown Company, Berlin, N. H.

"Cooperation of State Agency with the Consultant." Charles F. Baar, New York Conservation Department, Albany, N. Y.

Closed Session

A business meeting for Association members only will follow the open session.

Field Trips

Four field trips of special interest to consulting foresters have been arranged. Their time and dates will be announced at the open meeting.

General Meeting

Monday, November 11

Dwight B. Demeritt, Chairman

Morning Session

Theme: "Forest Land Use in Transition"

1. "The Northeast's Forest Heritage." Ralph W. Marquis, Northeastern Forest Experiment Station, Upper Darby, Pa.

2. "Impact of Shifting Land Use Patterns on Forest Policies and Programs." E. W. Littlefield, Division of Lands and Forests, New York Conservation Department, Albany, N. Y.

3. "Effect of Land Use Trends on Forestry Needs and Opportunities." George A. Garratt, School of Forestry, Yale University, New Haven, Conn.

Society Affairs Session

Monday afternoon, November 11

DeWitt Nelson, President
George A. Garratt, Vice President
Henry Clepper, Executive Secretary

1. Report of the President.
2. Report of the Executive Secretary.
3. Report of the editor of Society publications, Arthur B. Meyer.
4. Report of the editor of *Forest Science*, S. H. Spurr.
5. Committee reports.

Division of Forest Recreation

Monday evening, November 11

James P. Gilligan, Chairman
Felix C. Koziol, Vice Chairman
Frank W. Childs, Secretary

1. "Plans and Problems of the U. S. Forest Service Operation Outdoors." Edward P. Cliff, Branch of National Forest Resource Management, U. S. Forest Service, Washington, D. C.

2. "Recreational Development in the Forest Preserves of New York." William M. Foss and W. D. Mulholland, Division of Lands and Forests, New York State Conservation Department, Albany, N. Y.

3. "Recreation versus Forest Products in Land Use Planning." Frank W. Childs, National Park Service, Omaha, Nebr.

4. "Natural Area Values." John F. Shanklin, Technical Review Staff, U. S. Department of the Interior, Washington, D. C.

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Marathon tree farms cover millions of acres of woodland in the Lake States, Southern States and Canada. Modern and scientific forestry techniques are being practiced to conserve forest resources and to assure stabilization of future timber supplies.

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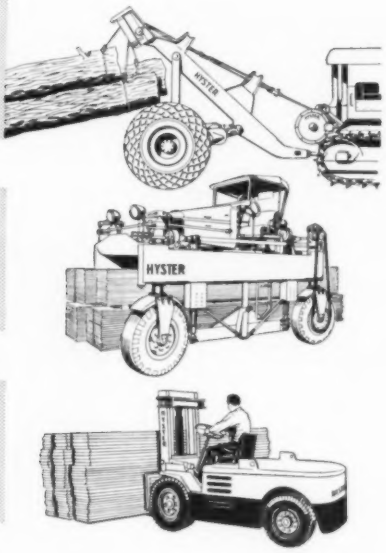

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Division of Watershed Management

Monday evening, November 11

E. G. Dunford, Chairman
Peter W. Fletcher, Vice Chairman
Sidney Weitzman, Secretary

1. "Watershed Problems in New York State." H. G. Wilm, State University of New York, College of Forestry, Syracuse, N. Y.

2. "Forest Watershed Problems and Opportunities in the Northeast." Howard Lull and Norman R. Tripp, Northeastern Forest Experiment Station, Upper Darby, Pa.

3. "Municipal Watershed Management in Practice." John M. Heilman, Division of Water Supply, Newark, N. J.

4. "Economic Research Needs in Watershed Management." G. R. Gregory, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Division of Education

Monday evening, November 11

David M. Smith, Chairman
A. Bigler Crow, Vice Chairman
Peter W. Fletcher, Secretary

"Field Use of Libraries." Martha Meelig, College of Forestry, State University of New York, Syracuse, N. Y.

Symposium: Encouraging the Best Qualified Young Men to Enter Forestry.

1. Report of the Society Committee on Career Counselling. T. D. Stevens, Department of Forestry, Michigan State University, East Lansing, Mich.

2. "Foresters for Tomorrow" Lynne M. Correll, Division of Personnel Management, U. S. Forest Service, Washington, D. C.

3. "The Public Relations Approach to Recruiting Forestry Students." Floyd E. Carlson, College of Forestry, State University of New York, Syracuse, N. Y.

Division of Silviculture

Tuesday, November 12

Henry I. Baldwin, Chairman
James D. Curtis, Vice Chairman
Earl H. Tryon, Secretary

Morning Session

1. "Oak Wilt: Its Significance, Spread, and Prevention." A. J. Riker, Department of Plant Pathology, University of Wisconsin, Madison, Wis.

2. Panel discussion: "The Place of Tree Improvement in Forest Pest Control."

Moderator, Harold J. Lutz, School of Forestry, Yale University, New Haven, Conn.

"The Possibilities and Limitations of Breeding for Pest Resistance in Forest Trees." Ernst J. Schreiner, Division of Forest Genetics, Northeastern Forest Experiment Station, Upper Darby, Pa.

"The Outlook for Breeding Trees Resistant to Insects." James A. Beal, Division of Forest Insect Research, U. S. Forest Service, Washington, D. C.

"Limitations of Tree Breeding and Selection in the Control of Disease." John S. Boyce, Osborn Botanical Laboratory, Yale University, New Haven, Conn.

"A Silviculturist's Viewpoint." George S. Meagher, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

3. "Possibility of Developing Strains of White Pine Resistant to

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the White Pine Weevil." William J. Gabriel, Northeastern Forest Experiment Station, Burlington, Vt.

4. "Height Growth of 81 Progenies of Ponderosa Pine." R. Z. Callaham and A. A. Hasel, California Forest and Range Experiment Station, Berkeley, Calif.

5. "Detection and Characteristics of Triploid Quaking Aspen in Nature." J. P. van Buijtenen, Dean W. Einspahr, and Philip N. Joranson, Institute of Paper Chemistry, Appleton, Wis.

Afternoon Session

1. Business meeting. Election of officers.

2. Report of the Committee on Stocking. C. A. Bickford, Northeastern Forest Experiment Station, Upper Darby, Pa.

3. Report of the Committee on Tree Improvement. Scott S. Pauley, School of Forestry, University of Minnesota, St. Paul, Minn.

4. "Forest Weed Control." Robert R. Morrow, Jr., Department of Conservation, Cornell University, Ithaca, N. Y.

Photographs of Nominees in November Issue

The November issue of the JOURNAL will display the photographs of those persons who have been nominated for president and Council membership of the Society of American Foresters for the forthcoming biennial election to be held December 2, 1957.

5. "Shallow Soils, Hardpans, and Root Penetration in the Spruce-Fir-Hardwood Forest of Northern New England." T. F. McLintock, Southeastern Forest Experiment Station, Lake City, Fla.

6. "Variation in Development of Low Plant Cover Following Chemical Brush Control." W. C. Bramble, W. R. Byrnes, and D. P. Worley, School of Forestry, Pennsylvania State University, University Park, Pa.

7. "Sand Pine Regeneration on the Ocala National Forest." Robert W. Cooper, Southeastern Forest Experiment Station, Lake City, Fla.

8. "Ecology of White Pine Silviculture in Central Ontario." David R. M. Scott, College of Forestry, University of Washington, Seattle, Wash.

9. "Wind-Caused Mortality in Minnesota Black Spruce in Relation to Cutting Methods and Stand Conditions." M. L. Heinselman, Lake States Forest Experiment Station, Grand Rapids, Minn.

10. "Effect of Storage Conditions on the Viability of Rocky Mountain Tree Pollens." Gilbert H. Fechner, College of Forestry and Range Management, Colorado State University, Fort Collins, Colo.

Division of Private Forestry

Tuesday morning, November 12

William C. MacAdam, Chairman
George V. Hjort, Vice Chairman
George W. Abel, Secretary

1. "Terminating Federal Supervision over Indian Forests." Kenneth

OF all the natural resource materials used to improve the economic and social well-being of modern civilization, wood is among the most important.

IN order to insure a never ending supply of this raw material, the Great Northern Paper Company participates in the Conservation and Forest Management Programs. These programs include the Tree Farms, proper cutting methods, fire prevention program and insect and disease control.

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[2] *This ancient miracle material is a natural organic ligno-cellulosic polymer, a true natural plastic commonly known as wood, composed of a complex of substances that has defied precise chemical definition.*

[3] *The basic process is called growth; the science of improving it forestry; the re-shaping is better known as forest products manufacturing.*

[4] *Surely you remember only who can make a tree.*

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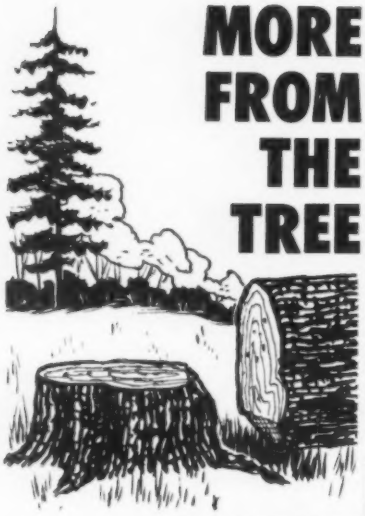

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B. Pomeroy, American Forestry Association, Washington, D. C.

2. "Fifty Years of Industrial Forestry with the Empire State Forest Products Association." Nelson C. Brown, Syracuse, N. Y., and A. B. Recknagel, Ithaca, N. Y.

3. "Significance of Price Reporting in Forestry." A. C. Shaw, Champion Paper and Fibre Company, Hamilton, Ohio.

4. Panel Discussion: "Forest Management by Private Foresters in the Northeast."

Moderator, William P. House, Consulting Forester, Chesham, N. H.; Robert Moore, Consulting Forester, Danville, Pa.; James D. Pond, Pond and Moyer Company, Ithaca, N. Y.

Division of Forest-Wildlife Management

Tuesday morning, November 12

William L. Webb, Chairman
Elbert H. Reid, Vice Chairman
Odell Julander, Secretary

1. "Trends in Wild Turkey Population in the Missouri Ozarks." John B. Lewis, Missouri Conservation Commission, Columbia, Mo.

2. "Future Role of State Conservation Departments in Forest-Wildlife Management." Frank B. Barick, Game Division, North Carolina Wildlife Resources Commission, Raleigh, N. C.

3. "Future Role of Federal Agencies in Forest-Wildlife Management." Clarence Cottam, Rob and Bessie Welder Wildlife Foundation, Sinton, Tex.

4. "Future of Forest-Wildlife Management in the Plans of Woodland Owners." Arthur L. Bennett, Department of Woodlands Operations, Armstrong Forest Company, Johnsonburg, Pa.

5. "Will There be a Transition from Free Public Hunting to Paid Shooting?" Edward L. Kozicky, Conservation Department, Olin Mathieson Chemical Corporation, East Alton, Ill.

6. Business meeting.

Division of Forest Products

Tuesday afternoon, November 12

Stephen B. Preston, Chairman
Harry E. Troxell, Vice Chairman
Bernard W. Granum, Secretary

1. "Changes in the Wood-Using Industry Accompanying Changes in Forest Resources." Raymond J.

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**THE WOODLANDS STORY, a 35-minute 16mm. color sound movie showing our forestry crews at work in the Lake States and Canada is available on loan. It has been widely used by forestry schools, civic groups, and the like. Write Public Relations Department, Kimberly-Clark Corporation, Neenah, Wisconsin.*

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Hoyle, College of Forestry, State University of New York, Syracuse, N. Y.

2. "Quality of Lumber which is not Measured by Grade." James S. Bethel, School of Forestry, North Carolina State College, Raleigh, N. C.

3. "Suitability of Eastern White Pine and Red Pine for Veneer and Plywood." John F. Lutz, Forest Products Laboratory, Madison, Wis.

4. "The Use of Bolter Saws in Conversion of Small Hardwood Logs." Richard M. Pierce, Forster Manufacturing Company, Farmington, Maine.

5. "The Reaggregated Wood Products Industry and What it Means to Intermediate and Salvage Cuttings." Paul J. Bois, Southeastern Forest Experiment Station, Asheville, N. C. and Arthur H. Haigh, Jr., Morgan Manufacturing Company, Black Mountain, N. C.

6. "Factors Contributing to the Increased Utilization of West Coast Hardwoods." Fred E. Dickinson, California Forest Products Laboratory, Richmond, Calif.

Division of Public Relations

Tuesday afternoon, November 12

Charles W. Mattison, Chairman
Fred E. Winch, Jr., Vice Chairman
J. Walter Myers, Jr., Secretary

No meeting scheduled.

Division of Forest Management

Wednesday, November 13

Gerald S. Wheeler, Chairman
Walter F. McCulloch, Vice Chairman
E. W. Littlefield, Secretary

Morning Session

1. "Cover Mapping Massachusetts from Aerial Photographs." William P. MacConnell, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst, Mass.

2. "A Trial Run in Continuous Forest Inventory in Canada." R. G. Belcher, Canadian International Paper Company, Montreal, P. Q., Canada.

3. "Pulpwood Procurement in a Metropolitan Region." Stanley W. Hamilton, West Virginia Pulp and Paper Company, Mechanicville, N. Y.

4. "Some Problems of Tropical Forest Management." Sir Herbert Howard, Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England.

Afternoon Session

1. "Adapting the Management of a Large Tract of Private Timberland to

(Continued on page 766)

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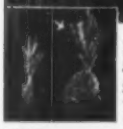

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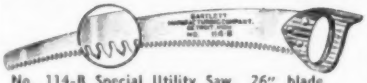

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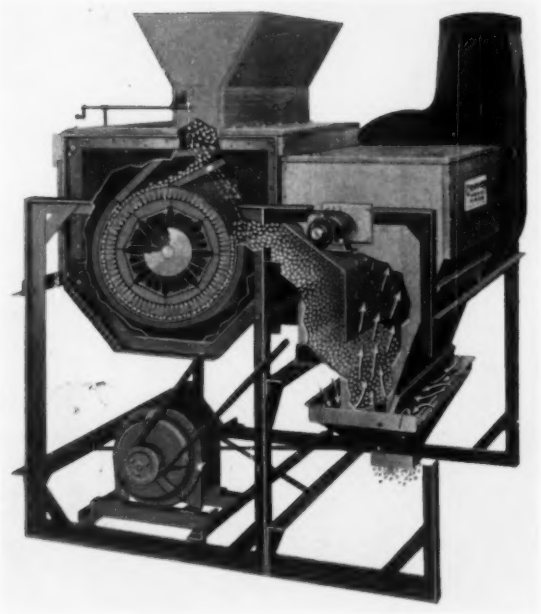

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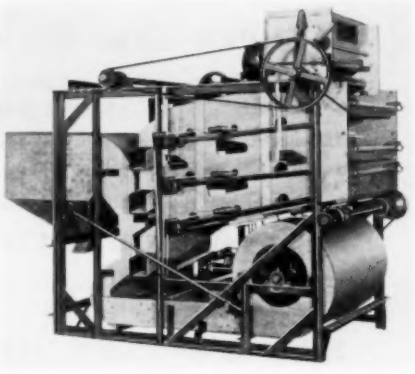

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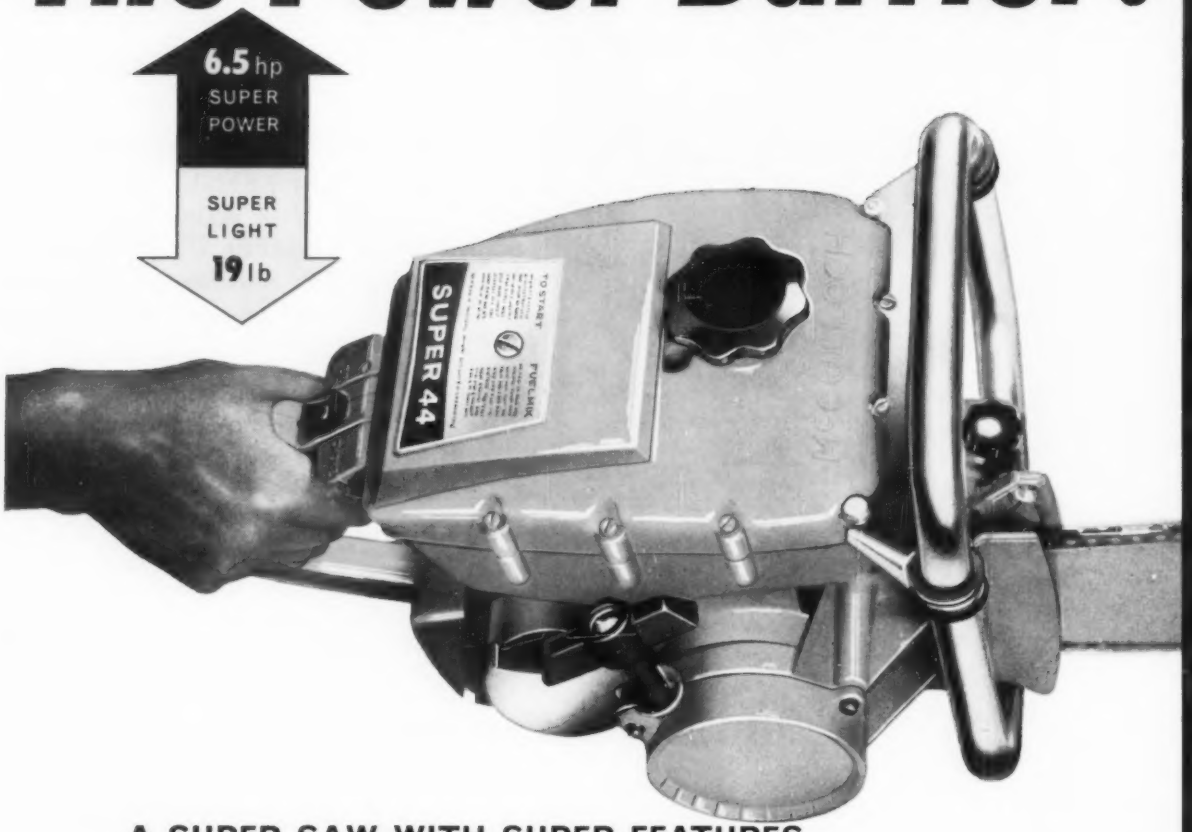

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Industrial Needs." Dwight B. Demeritt, Dead River Company, Bangor, Maine.

2. "Pilot Woodland Management Program in New Hampshire." Kenneth E. Barraclough, Extension Service, University of New Hampshire, Durham, N. H.

3. "Air Attack on Forest Fires." M. M. Nelson, Division of Fire Control, U. S. Forest Service, San Francisco, Calif.

4. "Growing Importance of Hardwoods to the Paper Industry in the Northeast." Gerald A. Pesez, International Paper Company, Glens Falls, N. Y.

5. Business meeting.

Division of Forest Economics and Policy

Tuesday afternoon, November 12

Carl H. Stoltenberg, Chairman
S. Blair Hutchinson, Vice Chairman
Ernest M. Gould, Jr., Secretary

1. "Forest Taxation Problems: How Serious and for Whom?" William A. Duerr, College of Forestry, State University of New York, Syracuse, N. Y.

Comments:

George B. Amidon, Minnesota and Ontario Paper Company, International Falls, Minn.

Paul M. Dunn, St. Regis Paper Company, New York, N. Y.

Paul F. Liniger, Industrial Forestry Association, Portland, Ore.

2. "What Can be Accomplished"

"By Improving the Property Tax: Some Promising Developments." Ellis T. Williams, Division of Forest Economics Research, U. S. Forest Service, Washington, D. C.

"By Special Forest Tax Laws: Lessons from New Hampshire." William P. House, Consulting Forester, Chesham, N. Y.

Comments:

W. D. Hagenstein, Industrial Forestry Association, Portland, Ore.

E. S. Hurd, Consolidated Water Power and Paper Company, Rhinelander, Wis.

James H. Kitchens, Jr., Louisiana Forestry Association, Alexandria, La.

Division of Range Management

(Joint meeting with the Division of Forest-Wildlife Management)

Wednesday morning, November 13

Elbert H. Reid, Chairman
Grant A. Harris, Vice Chairman
Joe A. Wagner, Secretary

Topic: "Game Range Habitat Management."

1. "Effect of Pulpwood Cutting Practices on Deer." John D. Gill, Game Division, Maine Department of Inland Fisheries and Game, University of Maine, Orono, Maine.

2. "The Effect of Hardwood Removal on Wildlife." Vincent H. Reid, U. S. Fish and Wildlife Service, Nacogdoches, Texas.

3. "Differences in Range Vegetation Resulting from Grazing by Deer, Cattle, and Sheep." L. E. Riordan, Colorado Game and Fish Department, Denver, Colo.

4. "The Use of Fire in California Chaparral for Game Habitat Improvement." H. H. Biswell, School of Forestry, University of California, Berkeley, Calif.

5. "The Relation of Forage Production to Silvicultural Thinning of Ponderosa Pine in the Black Hills of South Dakota." Richard M. Hurd and Charles P. Pase, Rocky Mountain Forest and Range Experiment Station, Rapid City, S. Dak.

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The Annual Dinner

Wednesday evening, November 13

Maurice K. Goddard, Toastmaster

Presentation of awards for outstanding achievement in biological research contributing to the advancement of forestry.

Address by Fairfield Osborn, president of the Conservation Foundation, New York, N. Y.

Entertainment.

Field Trips

Four field trips have been planned prior to the meeting. These trips will be run on November 8 and 9 (Friday and Saturday). Three of them are to be of one-day duration, leaving Syracuse in the morning and returning in the evening of the same day. The fourth trip requires two days, leaving Syracuse Friday morning and returning Saturday evening.

If desired, two of the one-day trips can be selected—one on Friday and one on Saturday. Travel is to be by chartered bus.

Advance registration will be required to permit arrangements for transportation and for food and lodging where these are needed. Chairman of the Field Trip Committee is Neil J. Stout, State University College of Forestry, Syracuse 10, N. Y. Reservations must be received on or before November 1.

Since the one-day trips will cover about 200 miles, the cost per person will approximate $10. The two-day trip will be about 400 miles in length and the cost per person will approximate $20.

Descriptions of the trips follow:

Trip Number 1

A Study Of Transition In Land Use

A one-day trip within a 100-mile radius southeast of Syracuse to observe a wide range of land uses in an area where some of the land has completed the cycle of forest to farm, to idle land, and back to forest; but where aggressive urban development is forcing drastic changes in the planners' long-term views. Here, too, will be an opportunity to study the impact of super highways on land use. One such road is in operation across the area from east to west, and another is under construction north to south.

Considerable data have been collected from this area by the Colleges of Agriculture and Forestry as well as other state agencies. Two of the chief participants in this inventory of resources and formulation of pattern: Dr. Howard E. Conklin of the Department of Agricultural Economics of the State College of Agriculture at Cornell University and Prof. James E. Davis of the Department of Forest Extension at the State College of Forestry at Syracuse University.

Trip Number 2

The Submarginal Land Problem Solved By Reforestation

A one-day trip to visit plantations in central New York, where large areas of land were purchased by the state and planted to conifers during the 1930's. The problems of management, with emphasis on pruning and thinning, accessibility and labor supply, and future development of the plantations will be presented by Charles E. Baker, district forester of the New York State Conservation Department, Norwich.

New York State was faced with the problem of 6 million acres of submarginal and abandoned farm lands in the late 1920's. By constitutional mandate in 1930 the purchase and reforestation of 1 million acres were proposed.

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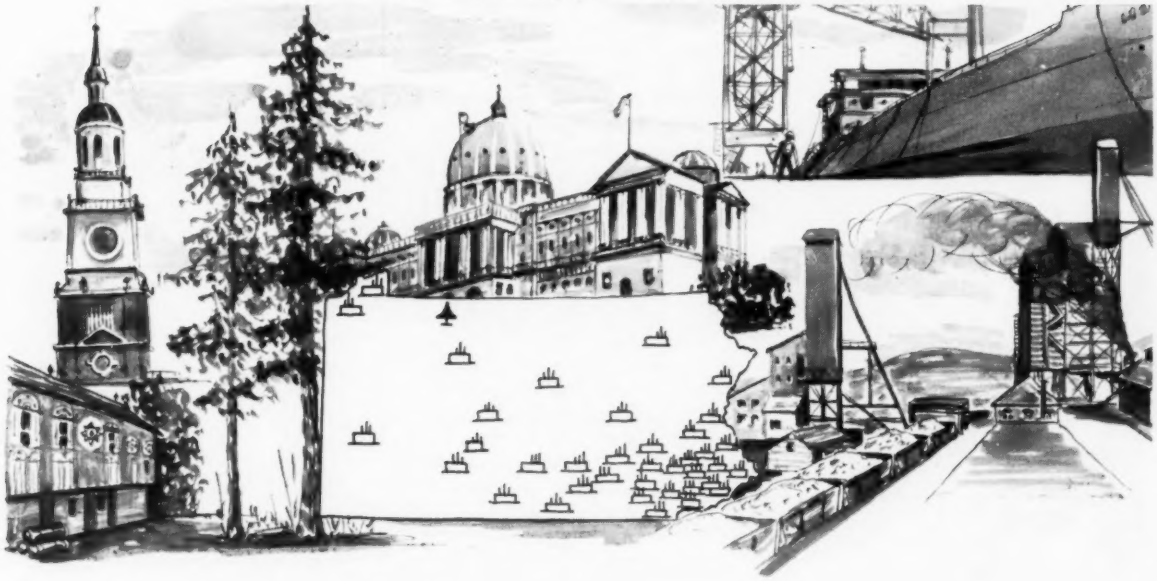

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Pennsylvania

When Charles II deed the area which is now Pennsylvania to William Penn in 1681, dense virgin forests, chiefly of white pine, hemlock and hardwoods covered 28,650,000 acres of the total 28,828,800 acres of land area. Today forests account for 53 percent of the total area.

From 1850 to 1900, Pennsylvania was the center of world lumber production. Lumber manufacturing was the State's first industry. The lumber from Penn's Woods was used in building the homes, farm structures, factories, ships and implements that made the Keystone State great.

During the last half century there has been a great rebuilding of these forests. The wisdom and industry of the State's people and conservation leaders were instrumental in restoring her timberlands.

The State's Department of Forests and Waters is playing a leading role in the restoration. This organization, in cooperation with the U. S. Forest Service and others, is educating the public to protect woodlands from fire and from attack by insects and diseases. Assistance is given to private woodland owners in the proper management of their forests. State Forests Tree Nurseries supply millions of tree seedlings each year which are planted for reforestation.

The Department recently completed intensive management plans for the 1,871,000 acres of State Forests which will provide considerable volumes of wood products for industry and greatly help the economy. The plans insure the greatest possible sustained supply of timber, increase growth in forests, reduce damage caused by insects and diseases, protect watersheds from erosion, and help to obtain maximum yields of fresh water and develop wildlife and recreational values of forests.

Today Pennsylvania's forests total 15,200,000 acres, and are very important in the state's industrial economy. Currently the annual wood growth in Penn's Woods is much greater than the drain. Forests provide full-time jobs for about 81,000 persons. Additional thousands are employed in transporting and processing wood. The State's forests annually produce the raw material for wood products that are worth more than one billion dollars.

Each year, millions of visitors use the facilities of Parks and Picnic areas in Pennsylvania forests.

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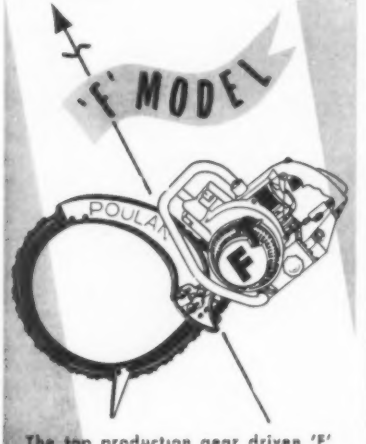

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Twenty-seven years later, 300 million trees planted on this land, known as State Forests, plus forest stand improvement on natural stands that were part of the abandoned farms, have created some of the best potential forests in New York.

About one-quarter of the reforestation on State Forests has been done in the area of this field trip. Starting at Sherburne, the trip will include demonstrations of several types of thinning and pruning in plantations 25-30 years old. Growth studies and forest inventory data on these plantations have shown that this program has solved a land problem by producing profits from forestry.

One of the highlights of the trip will be an inspection of the first Conservation Correction Camp established in 1956. This is a joint venture by the State Department of Correction and the Conservation Department on 35,000 acres of State Forests in Chenango County. Fifty boys from 16-20 years of age are engaged in a variety of forestry and game management practices.

Municipal forests of considerable size, operating under the provisions of the New York Forest Practice Act, will also be visited.

Trip Number 3

Hardwood Woodlots and National Wildlife Refuge

A one-day trip to visit two of the most productive woodlots in central New York and the Montezuma National Wildlife Refuge. Management and yield information for the woodlots visited will be presented by Fred E. Winch, Jr., state extension forester from the College of Agriculture at Cornell University. The program at the Wildlife Refuge is being arranged by Dr. Maurice M. Alexander of the State University College of Forestry at Syracuse University.

The Lawrence Hoyt Woodlot. This farm woodlot of 15.5 acres has been in single ownership, and under a form of even-aged management, for more than 70 years. The stand is approximately 130 years old. It is composed of tulip poplar, red oak, white ash, black cherry, sugar maple, and beech. The average height of dominant trees ranges from 90 to 110 feet. It is a good example of a highly productive stand on a high quality site.

The Webster Woodlot. This woodlot of 15 acres has been under continuous management since 1932. It is composed primarily of hickory and

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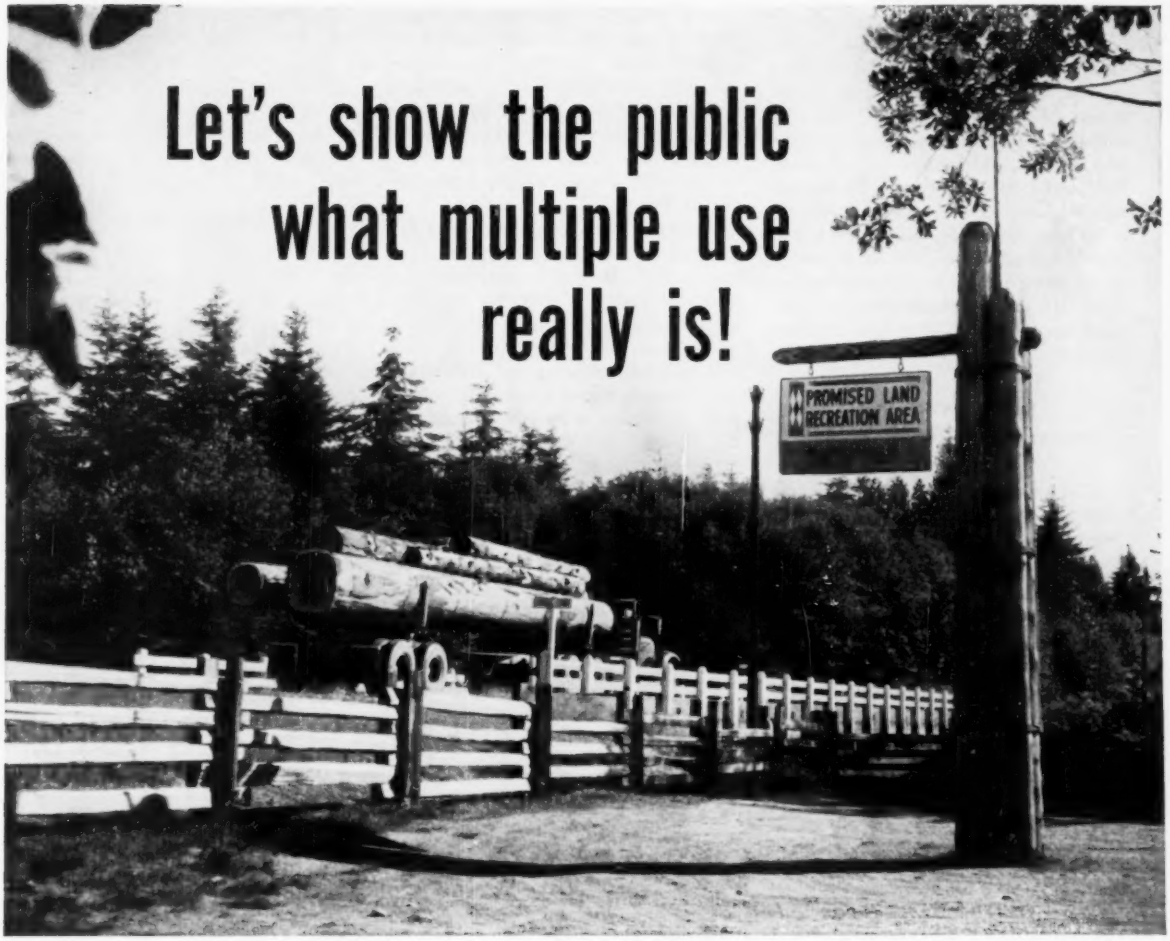

Today there's a growing public demand for recreational use of forest land, public as well as private. Rayonier recognizes that woodland ownership carries a public responsibility too. This includes not only maintaining our timber in perpetuity. It requires that we, as advanced conservationists, integrate recreation as a legitimate multiple forest use.

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oak on a medium to poor site. Yields have been largely in the form of fuelwood. Accurate records of income and expenses over the first 15 years of operation indicates a net return to labor of $1.30 per hour.

Montezuma National Wildlife Refuge. This refuge is located 35 miles west of Syracuse where U. S. routes 5 and 20 cross the Seneca River. Established in 1941, it contains an area of 5,819 acres, about one-half of which has been artificially flooded. Although natural habitats are provided here for a variety of wildlife, the refuge is primarily intended to serve as a resting and feeding place for migratory waterfowl. It is under intensive management by the U. S. Fish and Wildlife Service.

Trip Number 4

Forestry In The Pine Region Of The Adirondacks

A two-day trip through the southeastern region of the Adirondack Mountains. Highlights of the tour will include visits to the Luther plantations near Saratoga Springs and the Charles Lathrop Pack Demonstration Forest at Warrensburg.

The Luther forest embraces nearly 7,000 acres, about half of which is comprised of plantations of white, red, and Scotch pines, European larch, Norway spruce, and miscellaneous species ranging upwards of forty years of age. Owned and operated by a professional forester, the Luther property constitutes an outstanding example of the successful application of multiple-use management to private forest land. (See "Making a Forest Property Pay," JOURNAL OF FORESTRY, 45:781-782.)

The Pack Demonstration Forest is a 2,200-acre tract managed by the State University College of Forestry at Syracuse University. Noted for its productive white pine stands, it serves as an outdoor laboratory for teaching and research relating to silviculture, management, forest economics, botany, and utilization. Major emphasis of the visit to this property will be on white pine silviculture, and on fertilization experiments associated with the reforestation of depleted farm lands.

A brief tour of the State Forest Nursery at Saratoga Springs will be made, time permitting, following the visit to the Luther plantations. An after-dinner gathering will be held Friday evening at which representatives of the New York State Conservation Department will be on hand to discuss various phases of the Department's forestry work.

Trip will start from Hotel Syracuse at 8 a. m. November 8 and return at 6 p.m. November 9. Clothing should include raincoats, field shoes, and warm jackets. This trip is open only to men. Cost of $20 will cover transportation (by car pool or chartered bus), food, and lodging.

Ladies Activities

Monday, November 11. Three events are planned for this day. Chartered buses will leave Syracuse Hotel at 9:30 a. m. for the Onondaga Pottery Company plant, the home of Syracuse China. At 10:15 a.m. buses will leave for the Salt Museum on the shore of Onondaga Lake. Luncheon will be served at Martin's restaurant in Liverpool. Following entertainment there, the ladies will return to the hotel about 4 p.m.

Tuesday, November 12. The Ladies Forestry Forum will be held in the East Room of the Hotel Syracuse with a showing of time-lapse motion pictures photographed by Dr. William

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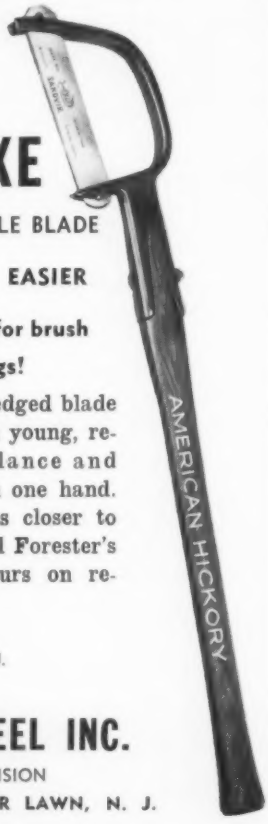

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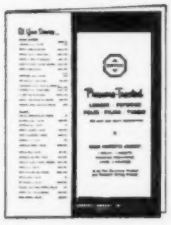

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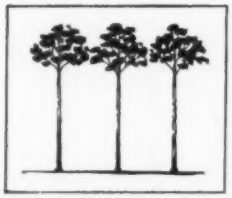

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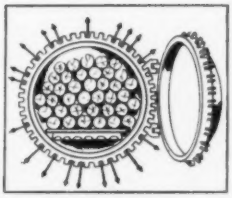

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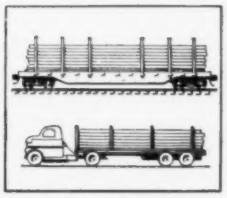

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M. Harlow. Miss Martha Meelig, librarian of the Moon Memorial Library, State University College of Forestry will speak. Her subject is "For Women, Too." Arrangements have been made for a group luncheon and a formal tea.

Wednesday, November 13. This is a "free choice day" for the ladies to shop, visit, or to choose one of several points of interest.

Those who did not have an opportunity to visit the Onondaga Pottery Company on Monday may sign up for a special tour, leaving the hotel at 9:30 a.m. and returning about noon. Sorority women are invited to visit their respective chapter houses on the Syracuse University Campus. Groups may visit a civic center for senior citizens; tour the Council of Social Agencies building; visit the Bureau of Municipal Research and hear a talk by the director; see student art work at the Lowe Art Center on the University campus; or visit the Syracuse Museum of Fine Arts.

Ladies are asked to make a choice at the time they register so that suitable arrangements may be made. There are no luncheon plans for the ladies' group on Wednesday. In the evening the Society's annual dinner will be served in the Hotel Syracuse. All ladies are invited.

Hotel Reservations

Those expecting to attend the meeting are urged to arrive in Syracuse on Sunday, November 10. There will be open house at the College of Forestry from 2 to 5 p.m., with conducted tours of the college buildings and the new $4 million Hugh P. Baker Forest Products Laboratory.

The Syracuse Hotel will be the headquarters for the meeting. This hotel has 600 rooms, but it will not be able to accommodate all those in attendance, hence other hotels are making space available. The Onondaga Hotel (500 rooms) is one block from the Syracuse. Other convenient hotels are listed.

All requests for room reservations should be sent to the SAF Housing Committee, in care of the Chamber of Commerce, 351 South Warren Street, Syracuse 2, N. Y. Second and third choices should be given.

Reservations will be accepted and confirmed in the order of their receipt. Assignment of rooms will be made at the desired rate or as near as possible. Early reservation requests are desirable.

The reservation coupon printed on page 777 may be used. However, readers who do not want to cut the coupon from their JOURNALS may request reservations by letter, providing all the information listed on the coupon.

Single rooms will be scarce, hence when possible twin-bed rooms should be requested.

Hotels

All rates quoted are with bath.

Syracuse Hotel, 500 South Warren Street; 600 rooms. Single rooms, $6.50 to $11; double-bed rooms for two, $10.50 to $13; twin-bed rooms, $11.25 to $14.50; parlor suites, $19.50 to $40; additional bed, $2.50.

Onondaga Hotel, South Warren at East Jefferson Street (one block from Syracuse Hotel); 500 rooms. Single rooms, $6.25 to $10.50; double-bed rooms for two, $9.50 to $12.50; twin bed rooms, $10.25 to $14; suites for two, $20; additional day bed, $3.

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Syracuse Hotel); 200 rooms. Single rooms, $5.50 and $7; double-bed rooms for two, $7.50 and $9; twin-bed rooms, $9 and $10; three twin-beds, $12 and $13.

Mizpah Hotel, 215 East Jefferson Street (two blocks from Syracuse Hotel); 120 rooms. Single rooms, $5 and $5.50; double-bed rooms for two, $7 and $8; twin-bed rooms, $8.

Hotel Jefferson-Clinton, West Jefferson and South Clinton Streets (four blocks from Syracuse Hotel); 140 rooms. Single rooms, $5.50 to $8; double-bed rooms for two, $8 to $9; twin-bed rooms, $8 to $12.

Hilton Hotel, 238 Harrison Street (two blocks from Syracuse Hotel); 105 rooms. Single rooms, $5 and $6; double-bed rooms for two, $7 and $8; twin-bed rooms, $8.

Seymour Hotel, 361 East Onondaga Street (four blocks from Syracuse Hotel); 95 rooms. Single rooms, $3.50 and $4; double-bed rooms, $5.

Wood Hotel, West Jefferson and Clinton Streets, three blocks from Syracuse Hotel (55 rooms). Single rooms, $4 and $5; double-bed rooms, $5.50 and $7; twin-bed rooms, $6 and $8.

Truax Hotel, South Warren and Harrison Streets (one block from Syracuse Hotel); 50 rooms. Single rooms, $4.50; double-bed rooms, $7; twin-bed rooms, $7.50.

Motels and Motor Lodges

There are seven motels and tourist courts in Syracuse. Those wishing this type of accommodation may obtain a list of them with their locations and rates from the Chamber of Commerce, 351 South Warren Street, Syracuse 2.

Usually an advance deposit is necessary to hold a motel reservation.

Committees for the Meeting

Hardy L. Shirley is general chairman for the meeting. Assisting him is John R. Meyering. Their address is College of Forestry, State University of New York, Syracuse 10, N. Y.

Program Committee

Paul M. Dunn is chairman of the Program Committee. His address is St. Regis Paper Company, 150 East 42nd Street, New York 17, N. Y.

The other members of the committee are William R. Adams, Henry I. Baldwin, E. W. Littlefield, and Roy W. Olson.

Committee on Arrangements

S. O. Heiberg is chairman of the Committee on Arrangements. Assisting him is John W. Barrett. Both are with the College of Forestry.

Special assignments on this committee have been made as follows:

Ladies Activities. Mrs. Ralph Unger.

Information and Publicity. Ralph G. Unger.

Field Trips. Neil Stout.

Exhibits. Russell C. Deckert.

Hotels and Housing. Paul F. Graves.

Registration and Welcome. Floyd E. Carlson.

Meeting Rooms. Howard C. Miller.

Projection and Public Address Equipment. Wilfred Cote.

Forestry Films. John Fedkiw.

Banquet. Kenneth C. Painter.

College of Forestry Reception. Harold G. Wilm.

Alumni Reunions. Neil J. Stout.

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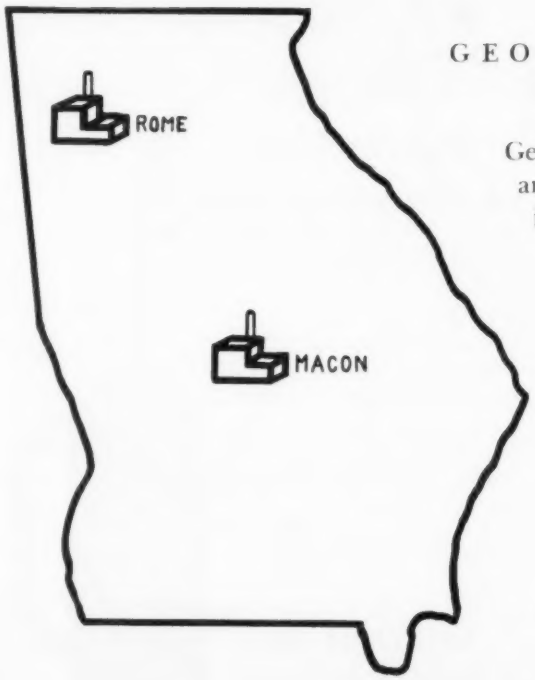

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Georgia Kraft Company, with plants at Macon and Rome, offers the individual land owner in the surrounding areas the services of experienced foresters covering the growth, harvest, and sale of all forest products. Using trained technicians, the company has been able to assist in the restoration of eroded areas and run-down farms that were formerly a liability to the people of the region. Many acres of land like this have been replanted with seedling pines to insure a continuous supply of wood for future operation, and to bring this lost land back into productive use for the South.

Some Points of Interest to Visiting Foresters

As an aid to visiting foresters who will travel by automobile to the Syracuse meeting, the following list of interesting forestry places has been specially compiled by the Information and Publicity Committee with the assistance of L. C. Rawson, New England Section; E. P. Farrand, Allegheny Section; and C. E. Farnsworth, New York Section.

This is a selected list and is not intended to be complete or all-inclusive. Places and highway route numbers are the basis for listing so as possibly to coincide with the itinerary of members' trips to Syracuse. Road maps should be used for reference in connection with this listing. Brief descriptions and names of persons to be contacted are given in some instances while in other cases, the facilities are always open for visitors and the names of the places indicate what is to be seen.

New England

Alfred, Maine. Me. 111. Massabesic Experimental Forest. USFS. 3,700 acres devoted to studies in the management of white pine. Present emphasis is on hardwood with silvicides as a step in reestablishing pine stands on brush land. Contact: T. W. Conkey, forester.

Eddington, Maine. Me. 178. Penobscot Experimental Forest. 4,000 acres. Purchased in 1950 by a group of nine Maine timberland owners for the purpose of turning it over to the U. S. Forest Service under a 99-year lease for research in forest management. Research on various ecological, silvicultural, and economic aspects of managing spruce, fir, and associated species. Contact: F. R. Longwood, Research Center leader, 64 Coe Bldg., Bangor.

Orono, Maine. U.S. 2. University of Maine. Undergraduate and graduate courses in forestry. 1,700-acre experimental forest at Old Town under intensive management.

Topsfield, Maine. U.S. 1; Me. 6. Dead River Company. Cutting rights on 100,000 acres of timberland belonging to Dead River Company granted to Eastern Corporation, Bangor, Maine. First arrangement of its kind in northeast. Cutting areas allocated five years in advance and cutting thereon is limited to three-quarters annual growth of whole property during that period. Contact: D. B. Demeritt, Eastern Corporation, Bangor.

Troy, Maine. U.S. 202. Troy Town Forest. 1,000 acres. Originally tax delinquent land. Since 1939 forest has paid planting costs and contributed several thousand dollars to the town.

Princeton, Maine. U.S. 1. Indian Township. Forest tract of 17,000 acres belonging to Passamaquoddy Indians. The State Forest Commissioner administers this area. All cutting has been marked since 1948 and made by the Eastern Pulpwood Company, Calais, Maine. The University of Maine forestry summer camp is here, and the students take care of the area. Growth study plots are laid out and maintained in cooperation with the Eastern Pulpwood Company. Proceeds go toward support of Indians. Contact: A. D. Nutting, comissioner, Maine Forest Service, Augusta.

Bartlett, N. H. U.S. 302. Bartlett Experimental Forest, USFS. 2,600 acres devoted to studies in the management of northern hardwoods.

Durham, N. H. U.S. 4. University of New Hampshire. Offers bachelor's degree in forestry and has a demonstration forest.

Hillsboro, N. H. U.S. 202. Fox Research and Demonstration Forest. New Hampshire Forestry and Recreation Commission. 1,107 acres devoted to experimental and demonstration work. Contact: H. I. Baldwin, New Hampshire Forestry Department, Concord.

Keene, N. H. N.H. 9 and 101. Yale Forest. Yale University, School of Forestry. 1,400 acres devoted to a large scale experiment in the production of pure crops of softwoods, chiefly white

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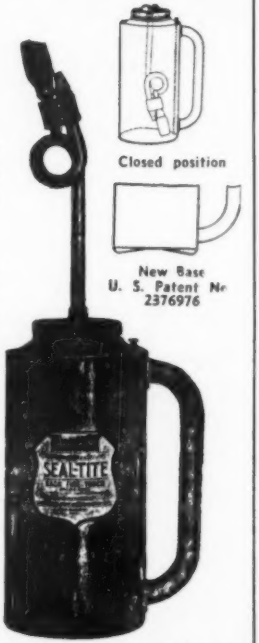

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pine. Contact: David M. Smith, Yale School of Forestry, New Haven, Conn.

Laconia, N. H. U.S. 3. White Mountain National Forest. 725,000 acres owned or under purchase contract. Has heavy recreational use. Contains many areas of natural interest. Includes important watersheds. Allowable annual cut is about 20 million board feet. Contact: Forest Supervisor, 719 Main Street.

North Stratford, N. H. U.S. 3. Phillips Brook Conservation Project. International Paper Co. 23,000 acres. Selective cutting to insure continuous supply of pulpwood on a ten-year cycle, in addition to such hardwoods as are marketable. In 12 cutting seasons and from 12 acres there has been cut 83,000 cords (or equivalent) of spruce, fir, white pine, and northern hardwoods. Contact: W. A. Ruch, Superintendent.

West Thornton, N. H. U.S. 3. Hubbard Brook Experimental Forest, USFS. 7,500 acres devoted to studies in watershed management of forest lands.

Winchester, N. H. N.H. 10. Harvard Forest. Primeval hemlock-northern hardwood-white pine. Severely windthrown in 1938 hurricane. Will be allowed to remain untouched to observe results. Contact: Dr. Hugh M. Raup, Harvard Forest, Petersham, Mass.

Charlotte, Vt. U.S. 7. Pease Mountain. 180 acres. Till soil area. Native hardwood management studies. Field plots. Contact: W. R. Adams, Forestry Department, University of Vermont, Burlington.

Jericho, Vt. Vt. 15. Vermont Research Forest. 365 acres. Management studies of native and exotic coniferous plantations. Small farm woodland sustained yield management. Utilization of small trees. Residence, laboratory, charcoal kiln, preservation, and small mill installation. Contact: W. R. Adams, Forestry Department, University of Vermont, Burlington.

Rutland, Vt. U.S. 7 and 4. Green Mountain National Forest. Purchase area 629,000 acres. Approximately 37 percent of land acquired. Planned annual cut 10 million board feet. Contact: Forest Supervisor.

Amherst, Mass. Mass. 9. University of Massachusetts. Offers Bachelor's degree in forestry; has Mount Tobey demonstration forest of 755 acres; manages Amherst Water Works forest of 1,500 acres.

Becket, Mass. Mass. 8. October Mountain State Forest. 15,000 acres. Excellent stands of northern hardwoods and spruce. Good example of controlled logging and multiple use.

Carver, Mass. U.S. 44. Myles Standish State Forest. 11,000 acres. Site of prison camp—prisoners work on state forest. Good example of management of pine-oak type directed toward conversion to better commercial forest.

Petersham, Mass. Mass. 122. Harvard Forest. 2,300 acres used for research and instruction of graduate students. Buildings house the famous Harvard Forest models. Contact: Dr. Hugh M. Raup, director.

Williamstown, Mass. U.S. 7; Mass. 2. Hopkins Memorial Experimental Forest, USFS. 1,636 acres devoted to studies in forest genetics, tree improvement, outplanting tests of hybrids of a number of tree species, hardwood regeneration, both natural and artificial, and rehabilitation of abandoned farm lands. Contact: F. E. Cunningham, forester.

New Haven, Conn. U.S. 1. Eli Whitney Forest (New Haven Water Company). 22,000 acres of natural forest and plantations under management since 1904. Outstanding example of successful forestry on watershed lands. Contact: David M. Smith, Yale School of Forestry.

New Haven, Conn. U.S. 1. Yale School of Forestry. A graduate School of Forestry. Oldest in the U. S. Contact: David M. Smith.

Norfolk, Conn. U.S. 44. Great Mountain Forest. 6,800 acres forest of hardwood and softwood owned by E. S. Childs and under intensive management. Site of summer field instruction of Yale School of Forestry. Contact: David M. Smith, Yale School of Forestry, New Haven.

Union, Conn. Yale Forest. 7,800 acre forest of hardwoods, hemlock, and white pine devoted to research. Contact: David M. Smith, Yale School of Forestry.

Warwick, R. I. R.I. 117A. Goddard Memorial Park. 472 acres. Contains some of the very earliest plantations in Rhode Island.

New York

Bainbridge. N.Y. 7. Borden Company, Chemical Division. Manufacturers of industrial resins, adhesives, and associated products used in furniture, plywood, and paper industry. Contact: C. C. Booth, head, Wood Products Section.

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Belmont. N.Y. 19. Allegany County Soil Conservation Service. Heavy equipment used for soil and water conservation work. Tree planting and application of good forestry practices to privately and publicly owned land. Contact: Malcolm R. Siefer, Soil Conservation Service, Library Building, Park Place.

Bliss. N.Y. 39. Beaver Lake Camp. Christmas tree grower. 150,000 trees of various species, ages, and sizes. Contact: Bion J. Clark.

Cayuta. N.Y. 13. Cotton Hanlon Inc. Plant consists of dry kilns, sawmill, planing mill, flooring mill, and dimension mill. Forestry program consists of tree farm woodlands. Importer of foreign woods. Contact: Dennis O'Neil.

Cooperstown. N.Y. 28. Alexander Forster. Charter tree farmer. 100 acre plantation ('39-'56); part thinned and pruned; 28 acres natural hardwoods. Improved under Forest Practice Act program. Contact: Alexander Forster.

Cooperstown. N.Y. 28. Otsego County Forestry Department. 3,500 acres of county forests. 36 year old plantations. Treating plant for highway guide posts. Contact: Stewart A. Wheeler.

Cooperstown. N.Y. 28. Otsego Forest Products Cooperative Assoc., Inc. A forest cooperative organization of 1,200 woodlot owners as members. Operates complete processing plant with sawmill, planing mill, and dry kilns. Contact: J. Leith Violette.

Cornwall-on-Hudson. U.S. 9W. Harvard Black Rock Forest. A silvicultural research forest in the hardwood region owned and operated by Harvard University. Contact: Benjamin B. Stout.

Cortland U.S. 11. Cortland Water Board. Approximately 200 acres of reforestation on the watershed and has deer, pheasants, and rabbits in the woods and ducks and large trout in pools. Reforestation started in 1912; have experimented with different sections. Many varieties of trees. Contact: Daniel J. Houlihan.

Deferiet. N.Y. 3. St. Regis Paper Company. A large modern paper mill. Contact: M. R. Fallon.

Dolgeville. N.Y. 29. North Hudson Equipment Co., Inc. Operates band saw mill manufacturing hardwood lumber and quarter sawing spruce fiddle butts, also manufacturing plants wherein are produced the piano soundboards and other piano parts. Contact: B. A. Wein.

East Aurora. U.S. 20. Soil Conservation Service—Buffalo Creek Flood Prevention Project. One of 11 flood prevention projects in the U. S. under Flood Control Acts of 1936, 1944, and 1946. Land treatment, including reforestation and woodlot improvement, stream bank stabilization and stream relocation. Contact: Leon F. Silverberger, Soil Conservation Service, Erie County Farm and Home Center.

Ellicottville. U.S. 219. Fitzpatrick and Weller, Inc. Manufacturers of shoe lasts, ten pins, and lumber. Contact: Joseph W. Fitzpatrick.

Frankfort. U.S. 58. The Union Handle Company. Manufactures ash logs into handles for hand farm implements. Contact: Brit Durell or Everett Colburn.

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Fulton. N.Y. 57 and 3. Armstrong Cork Company. (Arrowhead Plant). Plant blends wood fibers with rag fibers to produce sound deadening and vibration dampening felt for floor covering, automotive, and other industrial users. Defibrates wood with chippers, steam cookers, and attrition mills. Buys mixed hardwoods from area and blends fibers. Three paper machines, two Asplund units. Contact: Paul Furlow.

Glens Falls. U.S. 9. Finch, Pruyn and Company, Inc. Manufacturers of printing and converting papers, new neutral sulphite semi-chemical pulp mill, using hardwood pulpwood. Contact: Mrs. Esther Davis.

Glens Falls. U.S. 9. International Paper Company. The company has 150,000 acres of woodlands in New York supplying in part the needs of three pulp mills. Contact: G. A. Pesez.

Great Valley. U.S. 219. C. B. Norton and Son. Operate two permanent mills and one portable mill. Also a finishing-dimension mill, two modern kilns, and a box plant at Great Valley along with their main mill. Also have 20,000 acres of timber under sustained yield management. Contact: Ryan Norton.

Hancock. N.Y. 17. Robert Mallery Lumber Company Inc. Manufactures lumber from all kinds and grades of native timber with modern, efficient equipment. Contact: Robert Mallery.

Herkimer. U.S. 5 & N.Y. Thruway. Sperry Rand Corporation. Library Bureau, 801 Park Avenue. Over 75 years of experience in production of quality equipment for libraries and office. Contact: D. J. Lenney.

Ithaca. N.Y. 13. New York State College of Agriculture. Cornell University. Arnot Forest consists of 4,024 acres, primarily wooded, approximately 18 miles southwest of Ithaca. Dedicated to research, teaching, and demonstration in fields of forest, wildlife, and soil and water management. Contact: Bob Morrow, Arnot Forest.

Lacona. U.S. 11. Blount Lumber Company. Sawmill and mill work. Contact: H. P. Blount.

Lowville. N.Y. 12. Lowville Tree Nursery. A forest tree nursery producing 16 million tree seedlings a year. Contact: R. L. Evans, Box 86.

Lyons Falls. N.Y. 12. Gould Paper Company. Manufactures groundwood specialty paper. Their new hardwood plant has received world-wide attention in utilizing cull and weed hardwood in paper making. Contact: John Parry.

Massena. N.Y. 37. St. Lawrence Seaway. Contact: Chamber of Commerce, Information booth.

McConnellsville. N.Y. 13. The Frank S. Harden Company, Inc. Manufactures solid cherry dining room, bedroom, and upholstered living room furniture. Contact: W. B. Lambert.

McGraw. N.Y. 41. McGraw Box Company. Specializes in fancy wooden cabinets of high quality. One of largest suppliers of silverware chests in U. S. Contact: Claude Congdon.

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Pulp and Paper Company. A large paper mill using hardwood pulpwood. Contact: S. W. Hamilton.

Newcomb. N.Y. 28N. Archer and Anna Huntington Wildlife Forest Station. A 15,000 acre wildlife research forest owned by the State University College of Forestry. Contact: Ralph Hutchinson or Earl Patric.

Paul Smiths. N.Y. 10. Adirondack Research Center. Forest management research, including timber stand improvement with silvicides. Contact: Francis M. Rushmore.

Paul Smiths. N.Y. 10. Paul Smith's College. The college has more than 20,000 acres of forest lands. Two two-year courses are offered. One is terminal; the other pre-professional. Contact: Chester L. Buxton.

Penn Yan. N.Y. 54. Penn Yan Boats. Small boat manufacturers who use oak, cedar, and mahogany lumber. Contact: R. J. Buckley.

Poland. N.Y. 8. Northern Lumber Company, Inc. Adirondack birch, hard maple, cherry—band sawn. Kiln capacity is 1,000,000 board feet per month. Contact: A. B. Flammer.

Poughkeepsie. U.S. 9. A. C. Dutton Lumber Corporation. The first eastern wholesale distributing yard for west coast fir lumber brought forward by water. (Opened simultaneously with Panama Canal—1914.) Contact: David Dutton.

Sabattis. N.Y. 10. Whitney Industries, Inc. Owners and managers of Whitney Park established in 1898 with assistance from Henry Solon Graves and Gifford Pinchot. Objectives—timber, recreation, water, fish, and game. Company logging, road building, water storage operations on 80,000 acres in Central Adirondacks. Contact: Thomas Church, Jr.

Saratoga Springs. U.S. 9. Saratoga State Tree Nursery. One of the largest forest nurseries in the world. Seed extracting plant, seed storage vault, and seed testing laboratory. Some of the most modern mechanical means of nursery operation and rapid counting of trees for shipping can be demonstrated. Contact: Elmer Terrell, Box 458.

Seneca Falls. U.S. 20. Montezuma National Wildlife Refuge. Established for protection of waterfowl resources. Consists of open marsh and swamp woodland with lesser acreage of cultivated fields and adjacent upland. Contact: The Refuge Manager.

New Berlin. N.Y. 8. Soil Conservation Service—Great Brook. Land treatment for watershed protection in a typical dairy section in Central New York. Contact: G. Claire Herting, Soil Conservation Service. Agricultural Headquarters, Norwich.

Stephentown. N.Y. 22. Cooxrox Forest. Private forest property intensively managed with careful records. Superior stands of larch. Contact: David B. Cook, 12 McPherson Terrace, Albany 6.

Liverpool. N.Y. 57. Onondaga County Park and Regional Planning Board. Operates six unit major county park systems containing many points of interest—French Fort, Salt Museum, Reforestation Areas, and Fish Hatchery. Contact: J. Howard Shattuck, P.O. Box 146.

Tupper Lake. N.Y. 10 & 3. Oval Wood Dish Corporation. Operates a band sawmill and hardwood flooring unit and manufactures woodenware items from single ply molded veneers. Contact: Gerald P. Hull, G. K. Nixon, or W. F. Hibbard, Jr.

Valhalla. N.Y. 22. John A. Hartford Forestry Research Center (Yale School of Forestry). Field station for basic research in tree physiology, forest genetics, and forest ecology.

Wanakena. N.Y. 3. New York State Ranger School. A division of College of Forestry at Syracuse. The oldest institution of its kind in North America. Offers intensive 44-week terminal course in practical forestry. Contact: L. P. Plumley.

Warrensburg. U.S. 9. Pack Demonstration Forest. A forest intensively managed to demonstrate methods of growing white pine and other species. Contact: Prof. Clifford Foster.

Wayland. U.S. 15. W. H. Gunlocke Chair Company. Largest manufacturer of wood office chairs in the country. Of particular interest might be the steambending department where stock as thick as 10/4 is bent at right angles. Contact: Howard W. Gunlocke.

Pennsylvania

Warren. U.S. 6 & 62. Allegheny National Forest. Contact: E. M. Bacon.

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Brown Company is using more wood today than ever before. Sawmills and veneer mills have been added to its production facilities. Increases have been made in its pulp producing operations.

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Add to this scientific forest management . . . vigorous programs of fire and disease prevention . . . forestry education among small wood lot owners . . . and you have a guarantee that the forests will continue to be one of the strongest forces in the economy of Northern New England for generations to come.

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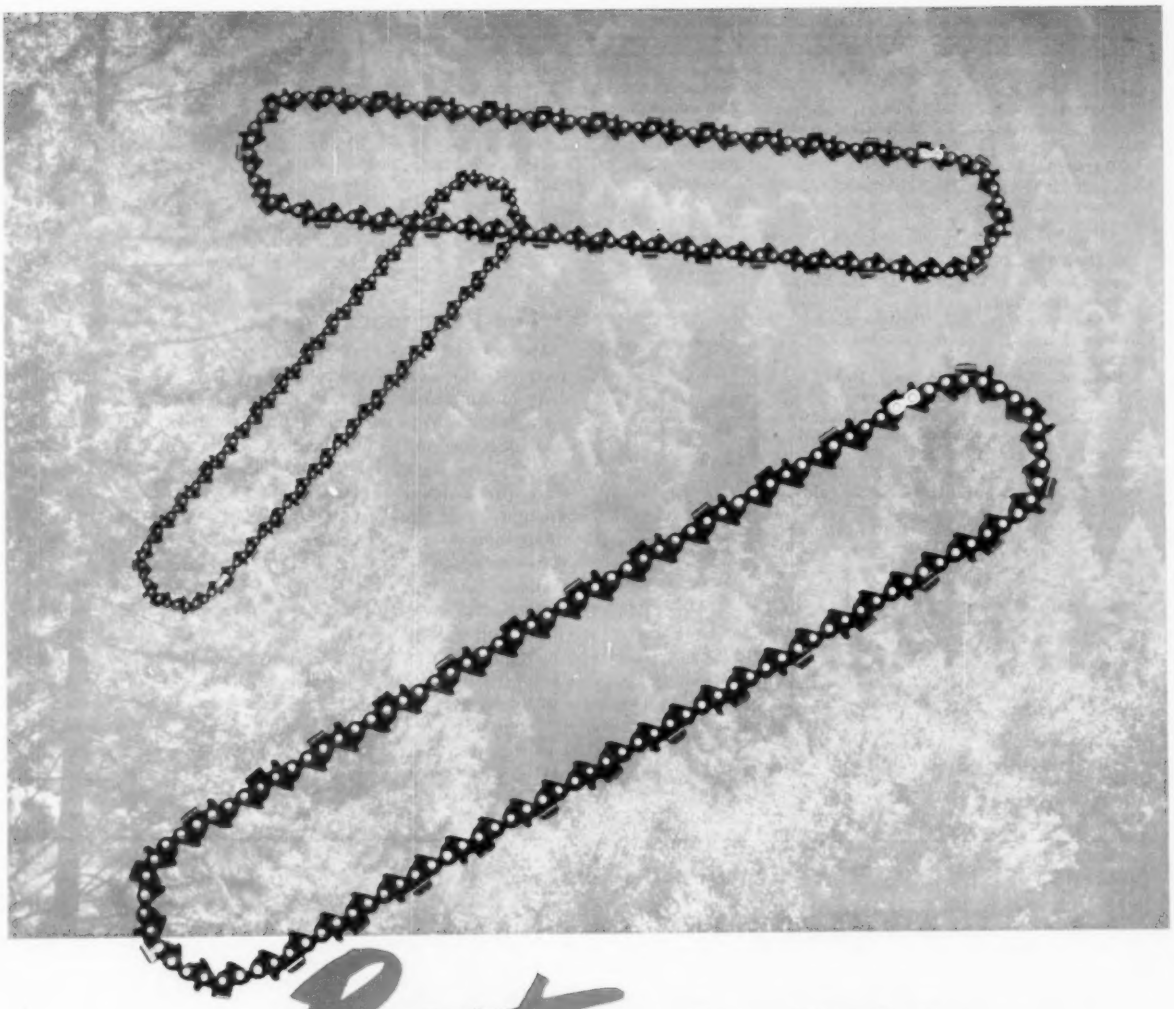

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- Side link and router rivet holes are *countersunk* to eliminate chain stretch and sloppiness.

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Benton. Pa. 254. Ricketts Glen State Park. Falls and Virgin timber. Contact: Joseph Kotroski.

Clarion. U.S. 322. Cook Forest. Virgin timber. Contact: O. L. Mulhollen, Box 471.

Clearfield. U.S. 322. Clearfield Nursery. Contact: Charles Nolder, R.D.

Endeavor. U.S. 62. Endeavor Lumber Company. Largest mill in area. Contact: R. J. Gustafson.

Gettysburg. U.S. 15. Glatfelter Pulpwood Company. Contact: D. E. Hess, Topper Building.

Gouldsboro. Pa. 507. Pocono Experimental Forest. Watershed and forest management.

Between Drehersville and Eckville. Pa. 895. Hawk Mountain Sanctuary.

Huntington. U.S. 22. Bear Meadows and Alan Seager Monument. Contact: F. H. Dutlinger, Box 245.

Greenwood Furnace. U.S. 22. Greenwood Nursery. Contact: Elwood Staley, Huntingdon, R. D.

Johnsonburg. U.S. 219. Armstrong Forest Company. Pulp and paper company. Forest management. Contact: A. L. Bennett.

Kingston. U.S. 11. Dilldown Experimental Forest. Watershed management.

Lima, U.S. 1. Tyler Arboretum. Delaware County.

Mont Alto. Pa. 223. Pennsylvania State Forest School. Contact: W. W. Ward.

Mont Alto. Pa. 223. Pennsylvania (Mont Alto) State Nurseries. Contact: Harry Staley.

Mont Alto. Pa. 223 Mont Alto Arboretum. Contact: Thomas DeLong, Department of Forests & Waters.

Philadelphia. Morris Arboretum. Contact: E. J. Schreiner, Northeastern Forest Experiment Station, Philadelphia 18.

Potters Mills. Pa. 322. Penn Nursery. Contact: John F. Meeker, Spring Mills, R.D.

University Park (State College). U.S. 322. Pennsylvania State Forest School. Contact: W. F. Bramble, Forestry Building, University Park.

Tyrone. U.S. 220. West Virginia Pulp & Paper Company. Contact: W. H. Lynn, Pulpwood Department.

Upper Darby. Pa. 3. Northeastern Forest Experiment Station. 102 Motors Avenue.

Wellsboro. U.S. 6. Grand Canyon of Pennsylvania, Leonard Harrison State Park. Natural red pine.

The President's Column

DEWITT NELSON

One of the objects of the Society of American Foresters is "to provide a medium for exchange of professional thought." It is interesting to review the progress made in this field through the medium of Society meetings. Since 1900 the Society has kept its sights on this increasingly important target—communication between its members. No place is this exchange, fellowship, and professionalism better exemplified than at the annual meeting.

The first meeting of the Society of American Foresters was the organizational meeting called by Gifford Pinchot in his office in the U. S. Department of Agriculture, Washington, D. C., on November 30, 1900. Seven men attended, and they became the Charter Members. They met again on December 13, 1900, and adopted a Constitution.

The first open meeting of the Society was held in the Pinchot residence in Washington, D. C., on January 24, 1901. Thereafter executive meetings and open meetings were held monthly, sometimes oftener, during the autumn, winter, and spring. These meetings were frequently held in private homes, often at 1615 Rhode Island Avenue,

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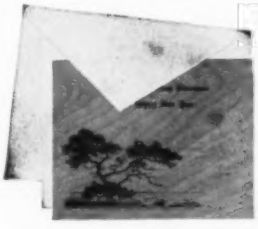

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We once heard a description of advertising which used "The Church on the Hill" as an example. The church had stood there for decades and everyone knew it was there, yet each Sunday morning the church rang its bell.

We find in this business of processing logs into home products and papers that you have to keep reminding people you have these products to sell. Even when you have been in business 62 years, as has Simpson, the necessity for keeping the public advised about your business never lessens.

The ad in the *Post* seems a long way from the tree in the forest; yet the result of that full-color page eventually is felt in local decision whether to let the tree stand, or cut it and sell it.

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the Pinchot residence, later in the old Atlantic Building on F Street, which for years housed the U. S. Forest Service, and in the Cosmos Club and National Museum.

At the open meeting of March 26, 1903, in the Pinchot home occurred an event that was and continues to be unique in the annals of American forestry. President Theodore Roosevelt gave an address on "Forestry and Foresters."

In his introduction he said, "I have felt that the meeting this evening was of such a character as not merely to warrant but to require that I should break through my custom of not going out to make speeches of this sort, for I believe that there is no body of men who have it in their power to-day to do a greater service to the country than those engaged in the scientific study of, and practical application of, approved methods of forestry for the preservation of the woods of the United States."

In 1910 the Constitution was amended to provide "for an annual meeting for the transaction of business and the presentation and discussion of professional papers." Presumably, these were wholly executive or business meetings, held in Washington, D. C.

In 1913, the Society became an affiliated society of the American Association for the Advancement of Science. However, the Society's first annual meeting in conjunction with the AAAS was not held until December 1917 in Pittsburgh.

According to the secretary's report for 1914, nine open and six executive meetings were held during the year, the largest number in any twelve-month period. Average attendance at the open meetings was fifty. However, at one open meeting at Cornell University in May, the attendance totalled 256. Total membership of the Society was 299.

At the annual executive meeting of the Society, held January 11, 1915, in New York, President B. E. Fernow made the following interesting comment:

While the Society is small in numbers, and at that scattered over the whole country, it stands to reason that hardly ever a fully attended representative meeting is possible. By necessity, meetings of the Society can only be sectional, local, and small; yet the meetings are, or can be made, of greatest value in promoting comradeship, in bringing out hidden knowledge, and in educating the public. Hence, to make the use of this means of fostering forestry more effective, it is suggested to extend the formation of branches or sections, a few having been in existence for some time.

Even then, if the membership of sections is confined to members of the Society itself, they would probably be too small to make frequent meetings successful. It is therefore proposed to permit sections to increase their membership from outside the Society by electing associate members or assessors from men who are more or less technically interested in forestry, like lumbermen, wood manufacturers, etc., and from assistants who are not or are not yet eligible to the Society. In this way the object of the Society of 'disseminating knowledge of the purpose and achievement of forestry'' may also, to some extent, be accomplished.

On October 18, 1915, a meeting of the Society was held in San Francisco at the Panama-Pacific International Exposition. The morning and afternoon sessions were open to the public; the evening session, Henry S. Graves presiding, had as its theme "The Society's Duties in Furthering the Ideals of the Profession." The attendance at the open meeting was 105 ("believed by those present to have broken all previous records"). The number of members present was 37.

During the autumn-winter-spring season of 1915-1916, 11 meetings were scheduled, all in Washington, D. C., with the exception of the one in San Francisco. These were meetings of the Society and not just of the Washington Section. As a matter of fact, the Washington Section was not yet organized. Meanwhile, Sections had been organized in Portland, Ore., in Denver, Colo., and in Missoula, Mont. All these Sections were holding meetings. When the Washington Section was organized in October 1916, the frequent meetings thereafter in Washington, D. C., were held under the auspices of the Section and were not meetings of the national organization.

In the table (see page 710) compiled by Henry Clepper is a list of all the meetings for which records are extant. In some cases attendance figures are lacking. If any old timers among the members can supply verifiable records of attendance at these early meetings, our executive office will be grateful.

Our 21 Sections and 70 Chapters each hold two or more meetings annually, in addition to our national meetings which now attract more than one thousand members and guests. In this respect the Society amply fulfills one of its main objects: "to advance the profession of forestry through cooperative thought and a spirit of solidarity among foresters."

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Nominations for the Council

Seven calls for nominations to the Council that will hold office during the biennium 1958-1959 were published monthly in the JOURNAL, beginning with the February issue and continuing through August.

Nominations closed September 18. No nominating petitions were valid if received in the Society's executive office after that date.

The Constitution provides that there shall be at least two candidates for the office of president (the runner-up is declared vice president) and at least nine candidates for membership on the Council. Inasmuch as this constitutional requirement has been met, by petitions submitted by the voting members, the Nominating Committee will make no nominations of its own, according to J. H. Johnson. Committee chairman.

Nominations Received

When nominations closed September 18 the following had been received:

For President

George A. Garratt, New Haven, Conn. (Vice president, 1956-1957).

Henry J. Malsberger, Atlanta, Ga.

For the Council

B. E. Allen, Savannah, Ga. (Council member, 1956-1957.)

Philip A. Briegleb, New Orleans, La. (Council member, 1956-1957.)

Donald E. Clark, Denver, Colo.

Chas. A. Connaughton, San Francisco, Calif.

Kenneth P. Davis, Ann Arbor, Mich.

M. B. Dickerman, St. Paul, Minn.

Glen R. Durrell, Stillwater, Okla.

M. K. Goddard, Harrisburg, Pa. (Council member, 1956-1957.)

Rudolph H. Grabow, Bedford, Ind.

William D. Hagenstein, Portland, Ore.

Dahl J. Kirkpatrick, Albuquerque, N. Mex.

P. T. Lannan, Georgetown, S. C.

L. S. Newcomb, Jackson, Miss.

A. D. Nutting, Orono, Maine.

Russell Stadelman, Memphis, Tenn.

J. Herbert Stone, Portland, Ore. (Council member, 1956-1957.)

Henry J. Vaux, Berkeley, Calif. (Council member, 1956-1957.)

Ernest Wohletz, Moscow, Idaho.

Nominations for Fellow

Seven calls for nominations to the grade of Fellow were published monthly in the JOURNAL, beginning with the February issue and continuing through August.

Nominations closed September 18. No nominating petition would have been valid if received in the Society's executive office after that date.

Fellow Nominations

When nominations closed September 18, the following Members had been nominated for the grade of Fellow:

N. T. Barron, Franklin, Va.
Walter E. Bond, New Orleans, La.
Robert S. Campbell, New Orleans, La.
C. Huxley Coulter, Tallahassee, Fla.
Charles C. Cowan, Seattle, Wash.
Guyton DeLoach, Atlanta, Ga.
James F. Dubuar, Wanakena, N. Y.
Bernard Frank, Washington, D. C.
Paul M. Garrison, Bogalusa, La.
S. R. Gevorkiantz, St. Paul, Minn.
B. F. Grant, Athens, Ga.
Willard R. Hine, Avondale Estates, Ga.
Edwin F. Heacox, Tacoma, Wash.
Svend O. Heiberg, Syracuse, N. Y.
Norman G. Jacobson, Tacoma, Wash.
Richard Kilbourne, Norris, Tenn.
Joseph C. Kircher, Mt. Dora, Fla.
H. J. Lutz, New Haven, Conn.
Harvey J. MacAloney, St. Paul, Minn.
H. J. Malsberger, Atlanta, Ga.
Perry H. Merrill, Montpelier, Vt.
Richard V. Miles, Jr., Tuscaloosa, Ala.
DeWitt Nelson, Sacramento, Calif.
Earl Porter, Mobile, Ala.
John A. Putnam, Leland, Miss.
Russell R. Reynolds, Crossett, Ark.
Jacob M. Stauffer, Montgomery, Ala.
W. G. Wahlenberg, Asheville, N. C.
Philip C. Wakeley, New Orleans, La.
L. T. Webster, Olympia, Wash.

Increase in Cost of Journal Binder

Increased manufacturing costs necessitate an increase in price to $3 of binders for the JOURNAL OF FORESTRY. This price will be effective as of December 1, 1957.

Binders hold 12 issues of the JOURNAL OF FORESTRY. They are of brown imitation leather, stiff board, square corners, lined. The title JOURNAL OF FORESTRY is stamped on front cover and backbone in gold foil.

Deadline for Consultants Listing

Consulting foresters who wish to have their names included in the Directory of Consulting Foresters, to be published in the January 1958 JOURNAL OF FORESTRY, should apply to the Society office not later than November 1, 1957. Information supplied should follow the form used in the directory published in the January 1957 JOURNAL. Members to be listed must be in good standing, i.e., have paid 1957 Society dues.

Consultants whose listings appeared in the previous directory and who have not returned inquiry cards mailed in September should do so at once.

Coming Events

Central States Section

Central States Section will meet October 3-4, at Herrin, Ill. Theme: "Forestry and Industry—A Partnership."

Toronto Faculty of Forestry 50th Anniversary

On October 25 the Toronto Faculty of Forestry will hold its fiftieth anniversary celebration.

Kentucky-Tennessee Section

The Kentucky-Tennessee Section has scheduled a meeting for December 6 and 7 in Nashville, Tenn.

Western Forestry and Conservation Assn.

The Western Forestry and Conservation Association will hold its 48th annual conference December 11-13 in Seattle, Wash. Theme: "The business of tree farming."

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ALBERT G. HALL
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Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of August are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of November 1957. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Junior Grade

Thomson, K. G., Park Supt., Pa. Dept. of Forests & Waters, Somerset, Pa. (Reinstatement).

Affiliate Grade

Mullins, C. E., Field Mgr., W. Va. Fire Protective Assoc., Charleston, W. Va. (Reinstatement).

Associate Grade

Selders, A. A., Wood Growth Specialist, Rayonier Inc., Whippany, N. J.

Appalachian Section

Junior Grade

Hendricks, H. R., Service Forester, Va. Div. of Forestry, Gloucester, Va.; N. C. State, B.S.F., 1951.

Leitner, L. W., Soldier, Fort Belvoir, Va.; Mich. College of Mining & Tech., B.S.F., 1955. (Affiliate 1957).

Member Grade

Haines, W. H. B., Forester, USFS, Asheville, N. C.; Yale, M.F., 1951. (Junior 1951).

Affiliate Grade

Blackburn, W. D., Jr., Forester, USFS, Robbinsville, N. C.

Central Rocky Mountain Section

Junior Grade

Student Eligible for Automatic Advancement

COLORADO STATE UNIVERSITY

Stocker, D. P.

Central States Section

Junior Grade

Werhane, E. F., Farm Forester, Ill. Dept. of Cons., Anna, Ill.; Mich. College of Mining & Tech., B.S.F., 1954. (Affiliate 1957).

Schwarting, W. C., Farm Forester, State of Ill., Chicago, Ill. (Affiliate 1956).

Students Eligible for Automatic Advancement

PURDUE UNIVERSITY

Wagner, W. J. Wirsching, R. F.

Columbia River Section

Junior Grade

Watson, J. C., Forester, Ohio Dept. of Natural Resources; Mich. College of Mining & Tech., B.S.F., 1954. (Affiliate 1954).

Gulf States Section

Junior Grade

Woodward, W. W., Chief Forester, May Bros. Inc., Eunice, La.; Okla. A & M, B.S.F., 1950. (Affiliate 1952).

Students Eligible for Automatic Advancement

LOUISIANA POLYTECHNIC INSTITUTE

Auld, A. B. McCain, D. L.
Garland, G. O. Wells, W. K.

LOUISIANA STATE UNIVERSITY

Bond, B. C. McLemore, B. F.
Lambert, D. F. Strickland, F. R.

Member Grade

Dykes, J. F., Forestry Agent, Ill. Central R.R., Baton Rouge, La.; LSU, B.S.F., 1949. (Junior 1952).

Gascon, R. J., Forester, Delta Match Corp., Kenner, La.; LSU, B.S.F., 1950. (Junior 1954).

Stockman, J. F., Forest Mgmt. Asst., Champion Paper & Fibre Co., Huntsville, Texas; API, B.S.F., 1951 (Junior 1951).

Affiliate Grade

Loring, J. H., Forest Tech., International Paper Co., Coushatta, La. (Reinstatement).

Nichell, J. W., Forester, USFS, Bentley, La.

Inland Empire Section

Junior Grade

Fredeking, W. J., Forester, USFS, Coeur d'Alene, Idaho; VPI, B.S.F., 1952; Montana State, M.F., 1953.

Plourde, A. E., Forester, Idaho Dept. of Forestry, Coeur d'Alene, Idaho; Mich. College of Mining & Tech., B.S.F., 1950. (Affiliate 1952).

Member Grade

Francis, J. B., Asst. Ranger, USFS, Curlew, Wash.; Mich. State, B.S.F., 1949. (Junior 1951).

Leaphart, C. D., Plant Path., USFS, Spokane, Wash.; Montana State, B.S.F., 1948; Yale, M.F., 1949, Ph.D., Forestry, 1954. (Junior 1951).

Ringold, G. B., Industrial Forester, Potlatch Forests Inc., Potlatch, Idaho; Univ. of Minn., B.S.F., 1950. (Junior 1951).

Smith, W. E., Ranger, USFS, Pierce, Idaho; Utah State Univ., B.S.F., 1953. (Junior 1953).

Spencer, R. W., Forester, USFS, Pierce, Idaho; Univ. of Idaho, B.S.F., 1949. (Junior 1951).

Intermountain Section

Junior Grade

Vitolins, A. N., Forester, Bur. of Land Mgmt., Boise, Idaho; Univ. of Idaho, M.F., 1957.

New England Section

Junior Grade

Chamberlain, L. C., Supt. International Paper Co., Mattawam, Maine; Univ. of Florida, B.S.F., 1952.

Member Grade

Bates, S. J., Landscape Tech., Conn. Park & Forest Comm., Hartford, Conn.; Ore. State, B.F., Forest Mgmt., 1951; Colo. State Univ., B.S., Park Mgmt., 1952. (Junior 1951).

New York Section

Member Grade

Cancell, B. R., Exec. V. Pres., St. Regis Paper Co., New York, N. Y. (Junior 39R55).

Northern California Section

Junior Grade

Weirs, E. I., Forester, Bur. of Indian Affairs, Hoopa, Calif.; Univ. of Calif., B.S.F., 1941.

Northern Rocky Mountain Section

Junior Grade

Oakland, J. W., Forester, USFS, Troy, Mont.; Mont. State, B.S.F., 1957.

Member Grade

Campbell, D. P., Forester, Tree Farmers Inc., Missoula, Mont.; Univ. of Idaho, B.S.F., 1950. (Junior 1953).

McDougal, J. J., Dist. Ranger, USFS, Wisdom, Mont.; Mont. State, B.S.F., 1951. (Junior 1953).

Ozark Section

Junior Grade

Gavit, R. J., Dist. Forester, Mo. Cons. Comm., West Plains, Mo.; Purdue, B.S.F., 1947.

Routh, D. C., Forester, USFS, Danville, Ark.; Okla. A & M, B.S.F., 1953. (Affiliate 1954).

Affiliate Grade

Brown, J. J., U. S. Army.

Lawson, E. R., Research Forester, USFS, Hot Springs, Ark.

Poague, L. E., Research Forester, USFS, New Orleans, La.

Puget Sound Section

Member Grade

Meister, K. R., Land Mgr., U. S. Plywood Corp., Kosmos, Wash.; State Univ. of N. Y., B.S.F., 1950. (Junior 1952).

Affiliate Grade

Hood, N. L., Forester, Kootenay Forest Prod. Ltd., Nelson, Canada.

Kindt,, C. S., Forester, Kootenay Forest Prod. Ltd., Nelson, Canada.

Southeastern Section

Student Grade

UNIVERSITY OF GEORGIA

Blackledge, W. H. Graham, J. P.
Bledsoe, P. L. Hadaway, P. L.
Estes, F. O. Herndon, T. H.

Junior Grade

Dellinger, J. C., Field Representative, Union Bag-Camp Paper Corp., Savannah, Ga. (Reinstatement).

Students Eligible for Automatic Advancement

ALABAMA POLYTECHNIC INSTITUTE

Brown, R. C. Davis, H. V.
Coan, H. H. Eisenhart, D. W.

UNIVERSITY OF FLORIDA

Haislett, B. M. Mason, R. K.

UNIVERSITY OF GEORGIA

Brown, H. G. Jones, H. H.
Canada, C. C. McAlpine, R. G.
Fowler, O. S. Purcell, J. H.
Thornton, B. I.

Member Grade

Renshaw, J. F., Forester, USFS, Atlanta, Ga. (Reinstatement).

Southwestern Section

Junior Grade

Knapp, H. A., Jr. Forester, USFS, Grants, N. Mex. (Reinstatement).

Upper-Mississippi Valley Section

Junior Grade

Students Eligible for Automatic Advancement

UNIVERSITY OF MINNESOTA

Peters, W. J.

Wisconsin-Michigan Section

Junior Grade

Bastian, J. W., Forester. Mich. Dept. of Cons., Lansing, Mich.; Mich. College of Mining & Tech., B.S.F., 1954.

Students Eligible for Automatic Advancement

MICHIGAN STATE UNIVERSITY

Clark, T. R. Hoffman, L. W.
Colby, G. A. Kulow, D. L.
Dearsley, R. G. Langguth, R. C.
Greene, W. B. Mason, R. H.
Thornburg, D. L.

Affiliate Grade

Lockwood, J. P., Asst. Dist. Forester, Mich. Dept. of Cons., Grayling, Mich.

No Section

Member Grade

Svendby, C., Forester, USOM, Bogata, Colombia. (Reinstatement).

Corresponding Grade

Sayeh, A. T., Chief, Bur. of Forest Cons., Monrovia, W. Africa; Acera, Gold Coast Tropical Forestry Course, Forest Mgmt. & Util., 1957.

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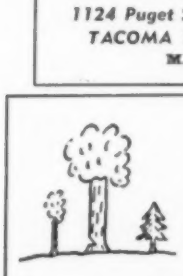
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Forestry News

Forest Tree Improvement Conference Held at University of Maine

More than 100 foresters and geneticists attended the fifth Northeastern Forest Tree Improvement Conference, held August 22 and 23 at the University of Maine, Orono.

The opening morning session, of which Edwin L. Giddings was chairman, was devoted to regional summaries of forest tree improvement work in progress. Reports were given by William J. Gabriel, Victor S. Jensen, Paul O. Rudolf, and Philip C. Wakeley. R. I. Ashman discussed the possibilities of Norway spruce in Maine.

On the afternoon of the first day the conferees went to the Penobscot Experimental Forest for a demonstration of the possibilities of genetical mass selection in the spruce-fir type. The leader of the field trip was Ernst J. Schreiner.

A series of scientific papers was presented at the final session, of which H. C. Buckingham served as chairman. Among the speakers were Francois Mergen, Paul O. Rudolf, Phillipe Bordeau, J. R. McWilliam, Jesse D. Diller, F. U. Klaehn, C. Allen Bickford, and E. J. Schreiner.

A resolution was adopted requesting the editors of the JOURNAL OF FORESTRY to schedule an entire issue during 1958 to a symposium of solicited papers on new developments in forest genetics and regional progress reports, for both the United States and Canada, summarizing past and current work in forest tree improvement.

New Officers of Canadian Institute of Forestry

G. W. I. Creighton, deputy minister of the Department of Lands and Forests, Halifax, Nova Scotia is the recently elected president of the Canadian Institute of Forestry. He succeeded J. W. B. Sisam, dean of the Faculty of Forestry at the University of Toronto.

The vice president is H. J. Hodgins of Vancouver, B. C.

The 49th annual meeting of the C. I. F. will be held in Toronto, October 22-24, 1957.

Photo: DeHavilland Aircraft of Canada, Ltd.

FAST PICK-UP and aerial delivery of water for fire suppression is the object of experimental work being carried in by the Air Services Division of the Ontario Department of Lands and Forests. The above plane is equipped with water tanks that can be filled while the aircraft skims over a lake. The two tanks, one on each float, can take on a total of 180 gallons of water in 18 seconds as the aircraft skims along the water surface dragging a refill pipe on the step of the seaplane float. On releasing of their cargo, the tanks revolve and open. According to Air Services personnel, the drenching effect at 100-foot altitude flight is more effective than water bombs.

South Chalks Up Another Record Pulpwood Cut

In 1956, for the 7th consecutive year, the South harvested a record cut of pulpwood and maintained its position as the nation's leading pulpwood-producing region. A report recently released by the U. S. Forest Service shows that the 12 southern states last year cut a total of 20,344,900 cords of pulpwood, an increase of 11 percent over production in 1955. This was 57 percent of the total receipts of domestic pulpwood at all pulpmills in the United States.

The report was prepared by the Southern Forest Experiment Station. The Southeastern Forest Experiment Station and the Southern Pulpwood Conservation Association cooperated in gathering the information.

Georgia, the South's leading producer, cut nearly 4 million cords, 19 percent of the South's 1956 total. Alabama and Mississippi harvested over 2 million cords each, and six other states cut more than 1.5 million cords apiece. Only two southern states, Tennessee and Oklahoma, produced less than a million cords apiece.

The report also shows an increase in the use of hardwoods for pulp. In 1956, 2.9 million cords of hardwood timber was cut for pulpwood, 11 percent more than in 1955.

Use of wood residue for pulp in 1956 increased 76 percent over 1955. Sawmill slabs, veneer cores, and cull cross ties obtained from other wood-using industries totaled 659,000 cords, or more than 3 percent of the total southern pulpwood production.

FHF Establishes New Committees

Two new committees, one in North Carolina and the other in the District of Columbia, have been organized by the Forest History Foundation.

Clarence F. Korstian, professor of silviculture at Duke University, is chairman of the North Carolina committee. The D. C. committee is temporarily under the chairmanship of Fred Hornaday, executive vice president of the American Forestry Association.

Roster of Registered Foresters in Michigan

The Michigan State Board of Registration for Foresters has recently issued a "Roster of Registered Foresters." The names and addresses of approximately 150 registrants are listed.

Copies of the roster may be obtained from the Board whose address is P. O. Box 492, Lansing.

Members of the Board are Rowland W. Blair, Manistee; Kenneth P. Davis, Ann Arbor; U. J. Noblet, Houghton; Robert E. Schmeling, Escanaba; and T. D. Stevens, secretary, East Lansing.

Northeastern Wood Utilization Council Plans Conference on Charcoal Production

The Northeastern Wood Utilization Council has announced a conference on "Charcoal Production and Uses" to be held at the Connecticut Agricultural Experiment Station, New Haven, Conn., November 20, 1957. This will be a sequel to the conference on the same subject held by the Council at the University of New Hampshire in in 1951.

"There have been tremendous developments and changes, both in charcoal production methods and markets, since 1951," says Fred C. Simmons, vice president of the Council, who is in charge of the program for the conference this year. "We plan to cover these developments, particularly in the field of small-sized charcoal production ventures, both by set papers presented by authorities in the field, and by open discussion among those attending."

The Conference will comprise discussion sessions during the morning and afternoon of November 20, and a luncheon at noon. The following day there will be open house visits to a number of nearby charcoal production facilities, and a new briquetting plant.

Education

Changes Name to Oklahoma State University

Oklahoma A & M College, Stillwater, officially changed its name to Oklahoma State University, according to a recent announcement by the Board of Regents. The change became effective July 1.

Private & Industrial

Union Lumber Co. Names New Head of Research

The appointment of Dr. Nicholas V. Poletika as director of research and development has been announced by C. Russell Johnson, president, Union Lumber Company. Dr. Poletika's appointment became effective early in September. He will make his headquarters at the Union Lumber Company plant in Fort Bragg, Calif.

Dr. Poletika was formerly employed by Timber Engineering Company, a research affiliate of NLMA.

Oregon Soils Scientist Joins Chemical Firm

C. T. Youngberg, who has been teaching and carrying on research in forest soils at Oregon State College for the past five years, has accepted a

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position in the research department in the Inorganic Chemicals Division of Monsanto Chemical Company, St. Louis, Mo.

His work will be in the development of a research program in the use of commercial fertilizers in forest production, with initial emphasis on the southern pine region. Eventually other regions will come in for consideration. Dr. Youngberg will also have responsibility for fertilization work in range improvement.

Landenberger Appointed Secretary of CRA

C. Frederick Landenberger, who has been in the Eureka office of the California Redwood Association for the past five years, has been appointed to succeed Selwyn J. Sharp as secretary of the association's tree farm committee. This committee is the official certifying agency for tree farms in the Redwood region.

St. Paul-Tacoma Co. Joins St. Regis

St. Paul & Tacoma Lumber Co., Tacoma, Wash., has become a division of the St. Regis Paper Co. The company manufactures and distributes fir plywood, kiln dry hemlock lumber, fir lumber, and wood chips.

New Forest Insurance Company Formed

A group of forest owners in Georgia have formed a company which will underwrite Georgia pinelands against destruction and loss by fire. The new firm, Forest Insurance Company, was formed by 104 initial stockholders. Most of them are Georgia timber owners.

Barrie L. Jones of Alma, president of the new company, said the insurance venture has aroused the keen interest of bankers because it lends a "present value" to unmerchantable or small timber.

The company reinsures its contracts with the famed Lloyd's of London. It will accept forest insurance risks in 147 of Georgia's 159 counties. That includes every county which is protected by the Georgia Forestry Commission.

Guyton DeLoach, head of the Georgia Forestry Department, is secretary of the new firm.

Three classifications of insurance are being offered to timber owners by the company. One protects against fire and insect damage by kill to unmerchantable size pine trees. Another protects against damage by fire to unmerchantable size pine trees on a burned area. The third protects against fire and insect damage loss to unmerchantable size pine and hardwood trees.

All three types provide up to $50 per acre in protection to timber owners.

Approximately 80 insurance agents in Georgia hold contracts to sell Forest Insurance. The company's home office is at 812 Grant Building, Atlanta 3, Georgia.

Glue-Laminated 2x4's in Production

The dependable 2x4, the bones of practically every house in America, has gone modern.

The Western Pine Association has announced that one of its member mills, Potlatch Forests, Inc., of Lewiston, Idaho, is now manufacturing glued laminated 2x4 lumber.

The new-style structural lumber has the same measurements as its long familiar counterpart, according to Carl A. Rasmussen, director of the association's research laboratories. Its laminated structure provides equal strength, he said, and assures straightness, dimensional stability, and sound nailability. It is manufactured in standard lumber lengths.

The product has been on the market for some time, and recently specifications were distributed by the FHA to its field offices for use on FHA-insured projects.

Scholarship Students Train at TECO Laboratory

Six forestry school graduates, winners of the lumber industry's 1957 scholarships, received special training at the laboratory of Timber Engineering Company, research affiliate of the National Lumber Manufacturers Association, in a ten-weeks' course this summer.

Participants, selected on the basis of their scholastic records, aptitudes, interests, and extra-curricular activities, were: William H. Hunt, Colorado A & M College; Roger F. Sutton, Yale University; John S. Fujii, University of Washington; Marvin F. Bengelsdorf, University of Michigan; Charles G. DeRidder, Michigan State University; and David A. Strause, Oregon State College.

This is the eighth consecutive year of the lumber industry's scholarship

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awards, given to encourage forestry school students to prepare for and seek employment in private wood industries. In addition to the training each student received $500 cash award.

Public

Alaska Fire Losses Equal Record

Fire losses in Alaska's forest lands, wildlife ranges, and scattered migratory waterfowl nesting grounds this summer were the worst since records were first kept in 1940, according to Bureau of Land Management Director Edward Woozley.

In August fire losses had equalled the 1940 records of 4½ million acres. Most of the fires which occurred in the western half of Alaska spread rapidly because of inaccessibility coupled with the driest season on record.

Nelson Is Forester For Yacolt Burn Project

Walter Nelson has been appointed project forester for the Yacolt Burn rehabilitation project in Vancouver, Wash. The project is under the direction of the State Department of Natural Resources.

Nelson fills the vacancy left by the promotion of Ralph Beswick to an administrative assistant position in the department's fire control division at the Olympia headquarters.

Nelson is a 1946 graduate of the University of Minnesota.

DeSilvia In Charge of Fire Control In Northern Region

Ernest R. DeSilvia has been appointed assistant regional forester in charge of the Division of Fire Control in the Northern Region, Chas. L. Tebbe, regional forester, announced recently. Mr. DeSilvia succeeds Alfred E. Spaulding who recently transferred to the Pacific Northwest Region in Portland.

Mr. DeSilvia has served as supervisor of the Mississippi National Forests for the past six years of his 24 years of service with the Forest Service. DeSilvia, who is a native of Seattle, Wash., received his BS degree in Forestry from the University of Washington in 1932. Most of his career with the Forest Service has been in the Southern Region.

Farrell Joins Station Staff

Dr. John H. Farrell of Delmar, N. Y. joined the staff of the Central States Forest Experiment Station on July 15. He has been assigned to the Columbia Forest Research Center at Columbia, Mo. to conduct economics studies in the production and use of timber in the Missouri area.

Farrell studied at Syracuse University, receiving his B.S. degree in forestry in 1942, an M.F. degree in 1948, and his doctorate in 1950. Before joining the Forest Service, he taught administrative and forestry subjects and worked for the New York State government in the field of land assessment and valuation.

Forest Service Training Officer Named

Luther B. Burkett, formerly staff officer on the Ottawa National Forest, Michigan, is the new regional training officer in the Pacific Northwest Region according to an announcement by Regional Forester J. Herbert Stone at Portland.

Burkett, who has held national forest positions in California and in the North Central Region, is a native of Illinois with a B. S. degree in forestry from Iowa State College in 1930. He replaces Edward Blaser who now will concentrate on safety programs as regional safety officer.

R. A. Campbell to Head Research Center

Robert A. Campbell, of the Southeastern Forest Experiment Station, has just been promoted to leader of the Southern Appalachian Research Center, where he will be in charge of forest research at the Bent Creek Experimental Forest. He takes the place of James F. Renshaw, who is moving from Asheville to a staff position in State and Private Forestry in Region 8 of the Forest Service, Atlanta, Ga.

Campbell has been with the Southeastern Station for 12 years. Prior to that, he was in forestry work with TVA at Norris, Tenn.

Forestry Employment

Positions Wanted

Forester, cum laude graduate, NYSCF, 1952. Age 27, married, 2 children. Experience: College teaching, research, surveying, photogrammetry, and timber cruiser for large paper company. Three years with aerial photogrammetric concern as office and field supervisor on all types and sizes of mapping projects. Excellent background in forestry and aerial photogrammetry. Desire position in private forestry or teaching.
Box E, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., N.C. State College, 1954. Age 27, married, two children. Completing tour as Army Engineer officer and Liaison Pilot March 1958. Desire position in Industrial Forestry in Southeast with opportunity for assumption of responsibility and advancement. One and one-half years pertinent professional experience. Commercial aircraft pilot license, 800 hours. Available in East for interview in December 1957.
Box F, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., Iowa State College, 1947. Age 35, married, 2 children, veteran. Ten years experience forestry, planting, fire prevention, chemical and mechanical weed and brush control and nursery operations. Desire position in forestry with private industry or civil forestry.
Box G, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester. Age 38, married, 1 child. Seeks forest management or public relations position. Seven years experience, managed 137,959 acre Douglas fir tract for BLM in Oregon. (67.5MM allowable cut), two years in Washington, D. C., one on federal forest policy, one on international resource problems. Past two years with forest industry trade association. Currently earning $8,400 per annum. Market slump prompts move.
Box H, Journal of Forestry, Mills Building, Washington, D. C.

Forester, B.S. 1954. Married, two children, veteran. Three years experience in management, fire control, and public relations. Prefer to remain in southeast.
Box I, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester. Age 24, married, one child. B.S. Forest Management, Oregon State College, 1955. Experience: state and industrial forestry four summers and Forest Service 5 months; Douglas-fir region. Currently Personnel Officer, Air Force, with responsibility and supervisory experience. Desire starting forest industry position in Northwest with opportunity to justify salary through profitable management work for employer. Excellent references. Available December 1957.
Box J, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S. degree. Age 44. Wants executive position in forest management; prefers pulp and paper industry. Any location in United States or Canada will be considered. Twenty years experience, supervisor scaling division, woods accounting, cruising, manager lumber sales and manufacture, logging engineer, and superintendent of woodlands.
Box K, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., Univ. of Maine, 1951. Age 32, married, no children. Seeks forestry and/or mineral exploration position with private industry. Experience includes fire protection, cruising, scaling, recreational management with Forest Service and private organizations in New England. Also three years experience as consulting forester; two years geophysical and geochemical prospecting for sulphide ores with Canadian-American mining company.
Box L, Journal of Forestry, Mills Building, Washington 6, D. C.

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Mullin Heads New Southeastern Division

According to an announcement from the U. S. Forest Service, George B. P. Mullin, former supervisor of the Jefferson National Forest, Roanoke, Va., has been named chief of the Division of Station Management at the Southeastern Forest Experiment Station and took over his new duties at Asheville, N. C., in August.

In his position as head of a new division at the Asheville Station, Mr. Mullin will assist the director in planning federal forest research in Virginia, the Carolinas, Georgia, and Florida and will direct and coordinate the administrative management and information activities of the Station.

Kimmey Transfers to Intermountain Service

Dr. James W. Kimmey, chief of the division of Forest Disease Research at the California Forest and Range Experiment Station, reported for duty as chief of the Division of Forest Disease Research at the Intermountain Forest and Range Experiment Station, Ogden, Utah on September 8.

Vessey Becomes Fellow in Soil Conservation Society

James K. Vessey, assistant regional forester in charge of state and private forestry for the Forest Service in Milwaukee, Wis., has been made a Fellow in the Soil Conservation Society of America. He has served on the Society's national council and is at present a vice president of the organization.

The Cover

The Harvard Forest Models, described and illustrated in a bulletin of that same title, include a series designed to portray the history of the central New England forests. Our cover this month was taken from photographs of three of the models in that series of seven. The interval of time covered by the series and the various phases of the forest history are indicated by the titles of the models: I- Primeval Forest; II- Homestead, 1740; III- Height of Cultivation, 1830; IV- Farm Abandonment, 1850; V- "Old Field" White Pine, 1910; VI- Pine Followed by Hardwoods, 1915; and VII- Hardwoods Reach Cordwood Size, 1930.

The photographs comprising our cover represent the height of cultivation, the development of old field stands of white pine following farm abandonment, and the hardwoods that followed harvest of the pine.

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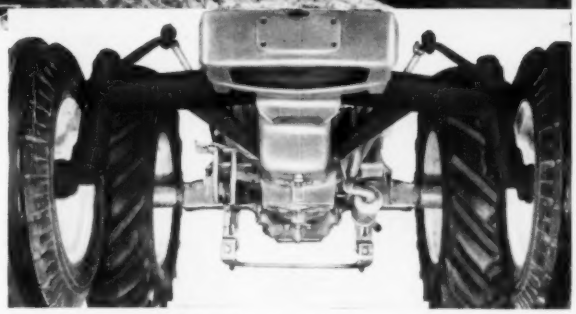
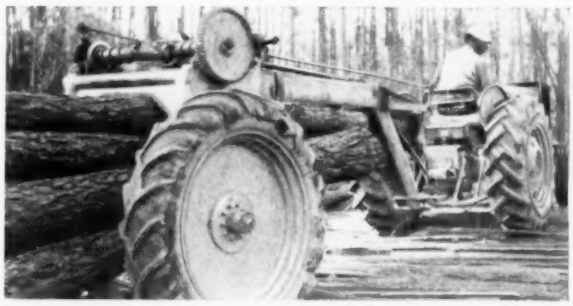


Extra-heavy-duty front axle gives you maximum ruggedness to stand up under the strain of continuous duty on rough terrain. It was designed for logging and other heavy-duty service.



15-Mbf daily are cut from logs fed the mill by just one International 300 Utility . . . according to M. J. Moore, logging contractor working out of Monroe, N. C. You'll out-log them all with the new and even more powerful International 350!

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EZ-6 lightest, most powerful direct drive chain saw made. 6 horsepower, 19 pounds. Easy to carry, easy to handle. Cuts trees up to 5 feet in diameter, zips through 8″ oak in 4 seconds, 18″ pine in 14 seconds.

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7-29 most powerful one-man chain saw you can own. 7 horsepower, 29 pounds. Powerful enough to bring down any tree in a stand. Fells trees up to 10 feet in diameter.